

WEBVTT

NOTE duration:"00:59:29.3760000"

NOTE language:en-us

NOTE Confidence: 0.86102873

00:00:18.540 --> 00:00:20.952 Alright, I think we're going to

NOTE Confidence: 0.86102873

00:00:20.952 --> 00:00:22.576 get started. Welcome everybody.

NOTE Confidence: 0.86102873

00:00:22.576 --> 00:00:25.432 My name is Lauren Tobias and I'd

NOTE Confidence: 0.86102873

00:00:25.432 --> 00:00:28.370 like to welcome you to our Yale

NOTE Confidence: 0.86102873

00:00:28.370 --> 00:00:30.002 Sleep Seminar this afternoon.

NOTE Confidence: 0.86102873

00:00:30.010 --> 00:00:32.194 I have a few quick announcements

NOTE Confidence: 0.86102873

00:00:32.194 --> 00:00:34.210 before I introduce today's speaker.

NOTE Confidence: 0.86102873

00:00:34.210 --> 00:00:36.352 First off, I can't believe how

NOTE Confidence: 0.86102873

00:00:36.352 --> 00:00:38.789 quickly time has flown this semester,

NOTE Confidence: 0.86102873

00:00:38.790 --> 00:00:40.700 but today is actually our

NOTE Confidence: 0.86102873

00:00:40.700 --> 00:00:42.610 last conference for the fall.

NOTE Confidence: 0.86102873

00:00:42.610 --> 00:00:44.696 We're going to resume on January 6th

NOTE Confidence: 0.86102873

00:00:44.696 --> 00:00:47.274 with a talk by Kathy Goldstein from

NOTE Confidence: 0.86102873

00:00:47.274 --> 00:00:49.294 the University of Michigan Sleep

NOTE Confidence: 0.86102873  
00:00:49.294 --> 00:00:52.409 Disorder Center and her talk is entitled  
NOTE Confidence: 0.86102873  
00:00:52.409 --> 00:00:54.173 Consumer Sleep Technologies Potentials.  
NOTE Confidence: 0.86102873  
00:00:54.180 --> 00:00:56.080 Set pitfalls in the future  
NOTE Confidence: 0.86102873  
00:00:56.080 --> 00:00:57.600 of ambulatory sleep tracking,  
NOTE Confidence: 0.86102873  
00:00:57.600 --> 00:00:59.880 so please join us for that  
NOTE Confidence: 0.86102873  
00:00:59.880 --> 00:01:01.400 on January 6th next.  
NOTE Confidence: 0.86102873  
00:01:01.400 --> 00:01:03.132 Some housekeeping announcements first.  
NOTE Confidence: 0.86102873  
00:01:03.132 --> 00:01:05.730 Please take a moment to make  
NOTE Confidence: 0.86102873  
00:01:05.801 --> 00:01:07.289 sure that you're muted.  
NOTE Confidence: 0.86102873  
00:01:07.290 --> 00:01:08.890 In order to receive CME  
NOTE Confidence: 0.86102873  
00:01:08.890 --> 00:01:09.850 credit for attendance,  
NOTE Confidence: 0.86102873  
00:01:09.850 --> 00:01:12.090 please see the chat room for instructions.  
NOTE Confidence: 0.86102873  
00:01:12.090 --> 00:01:14.666 You can text the unique ID for this  
NOTE Confidence: 0.86102873  
00:01:14.666 --> 00:01:16.248 conference until 3:15 PM today,  
NOTE Confidence: 0.86102873  
00:01:16.250 --> 00:01:17.850 and if you're not already  
NOTE Confidence: 0.86102873

00:01:17.850 --> 00:01:19.450 registered with Chelsea and me,  
NOTE Confidence: 0.86102873

00:01:19.450 --> 00:01:21.690 you will need to do that first.  
NOTE Confidence: 0.86102873

00:01:21.690 --> 00:01:22.970 If you have questions  
NOTE Confidence: 0.86102873

00:01:22.970 --> 00:01:23.930 during the presentation,  
NOTE Confidence: 0.86102873

00:01:23.930 --> 00:01:26.178 I encourage you to make use of the  
NOTE Confidence: 0.86102873

00:01:26.178 --> 00:01:28.088 chat room throughout the hour,  
NOTE Confidence: 0.86102873

00:01:28.090 --> 00:01:30.127 and we may invite people to ask  
NOTE Confidence: 0.86102873

00:01:30.127 --> 00:01:32.303 questions at the end of the hour  
NOTE Confidence: 0.86102873

00:01:32.303 --> 00:01:34.157 and then recorded versions of these  
NOTE Confidence: 0.86102873

00:01:34.227 --> 00:01:35.957 lectures will be available online  
NOTE Confidence: 0.86102873

00:01:35.957 --> 00:01:38.410 within two weeks at the link provided.  
NOTE Confidence: 0.86102873

00:01:38.410 --> 00:01:39.490 In the chat.  
NOTE Confidence: 0.86102873

00:01:39.490 --> 00:01:39.878 Finally,  
NOTE Confidence: 0.86102873

00:01:39.878 --> 00:01:42.206 please feel free to share the  
NOTE Confidence: 0.86102873

00:01:42.206 --> 00:01:43.788 announcements for this weekly  
NOTE Confidence: 0.86102873

00:01:43.788 --> 00:01:45.888 lecture series to anyone else you

NOTE Confidence: 0.86102873

00:01:45.888 --> 00:01:47.679 think might be interested and

NOTE Confidence: 0.86102873

00:01:47.679 --> 00:01:50.038 we're going to be sending out our

NOTE Confidence: 0.86102873

00:01:50.038 --> 00:01:51.832 full Winter Spring 2021 schedule

NOTE Confidence: 0.86102873

00:01:51.832 --> 00:01:54.010 in the next week or so.

NOTE Confidence: 0.86102873

00:01:54.010 --> 00:01:56.164 So now I'm delighted to introduce

NOTE Confidence: 0.86102873

00:01:56.164 --> 00:01:58.369 Doctor Christopher Klein as our speaker.

NOTE Confidence: 0.86102873

00:01:58.370 --> 00:01:59.112 This afternoon,

NOTE Confidence: 0.86102873

00:01:59.112 --> 00:02:01.338 Doctor Klein completed his PhD in

NOTE Confidence: 0.86102873

00:02:01.338 --> 00:02:03.154 exercise science at the University

NOTE Confidence: 0.86102873

00:02:03.154 --> 00:02:04.165 of South Carolina,

NOTE Confidence: 0.86102873

00:02:04.170 --> 00:02:06.055 with the dissertation focused on

NOTE Confidence: 0.86102873

00:02:06.055 --> 00:02:08.395 the effect of exercise training on

NOTE Confidence: 0.86102873

00:02:08.395 --> 00:02:10.365 the severity and health consequences

NOTE Confidence: 0.86102873

00:02:10.365 --> 00:02:11.941 of obstructive sleep apnea.

NOTE Confidence: 0.86102873

00:02:11.950 --> 00:02:14.030 He then completed a postdoctoral

NOTE Confidence: 0.86102873

00:02:14.030 --> 00:02:16.110 research fellowship and sleep and  
NOTE Confidence: 0.86102873

00:02:16.178 --> 00:02:18.110 chronobiology at the University  
NOTE Confidence: 0.86102873

00:02:18.110 --> 00:02:19.076 of Pittsburgh.  
NOTE Confidence: 0.86102873

00:02:19.080 --> 00:02:21.100 Currently he's an assistant professor  
NOTE Confidence: 0.86102873

00:02:21.100 --> 00:02:23.591 in the Department of Health and  
NOTE Confidence: 0.86102873

00:02:23.591 --> 00:02:25.611 Physical Activity and Health and  
NOTE Confidence: 0.86102873

00:02:25.611 --> 00:02:27.698 Human Development within the School  
NOTE Confidence: 0.86102873

00:02:27.698 --> 00:02:30.526 of Education at the University of Pittsburgh.  
NOTE Confidence: 0.86102873

00:02:30.530 --> 00:02:32.390 His research interests include the  
NOTE Confidence: 0.86102873

00:02:32.390 --> 00:02:34.759 role of exercise as a behavioral  
NOTE Confidence: 0.86102873

00:02:34.759 --> 00:02:36.511 treatment for sleep disorders  
NOTE Confidence: 0.86102873

00:02:36.511 --> 00:02:38.701 such as insomnia and OSA,  
NOTE Confidence: 0.86102873

00:02:38.710 --> 00:02:40.342 and the bidirectional relationship  
NOTE Confidence: 0.86102873

00:02:40.342 --> 00:02:42.382 between physical activity and sleep.  
NOTE Confidence: 0.86102873

00:02:42.390 --> 00:02:44.465 His numerous publications related to  
NOTE Confidence: 0.86102873

00:02:44.465 --> 00:02:46.540 these topics lectures regularly on

NOTE Confidence: 0.86102873

00:02:46.599 --> 00:02:48.982 sleep and exercise, and his mentoring.

NOTE Confidence: 0.86102873

00:02:48.982 --> 00:02:50.678 Numerous students and trainees.

NOTE Confidence: 0.86102873

00:02:50.680 --> 00:02:52.822 His current NIH funding includes a

NOTE Confidence: 0.86102873

00:02:52.822 --> 00:02:55.033 project examining the role of physical

NOTE Confidence: 0.86102873

00:02:55.033 --> 00:02:56.843 activity on cardiovascular risk in

NOTE Confidence: 0.86102873

00:02:56.843 --> 00:02:59.382 pregnancy and a project looking at

NOTE Confidence: 0.86102873

00:02:59.382 --> 00:03:01.230 how increasing physical activity

NOTE Confidence: 0.86102873

00:03:01.230 --> 00:03:03.018 among sedentary individuals may

NOTE Confidence: 0.86102873

00:03:03.018 --> 00:03:05.008 lead to blood pressure reduction.

NOTE Confidence: 0.86102873

00:03:05.010 --> 00:03:07.488 I think we all know that physical

NOTE Confidence: 0.86102873

00:03:07.488 --> 00:03:09.520 activity impacts sleep quality and

NOTE Confidence: 0.86102873

00:03:09.520 --> 00:03:11.780 daytime functioning in important ways,

NOTE Confidence: 0.86102873

00:03:11.780 --> 00:03:14.084 and I'm really looking forward to

NOTE Confidence: 0.86102873

00:03:14.084 --> 00:03:16.501 hearing Doctor Klein educate us all

NOTE Confidence: 0.86102873

00:03:16.501 --> 00:03:18.536 about this relationship this afternoon,

NOTE Confidence: 0.86102873

00:03:18.540 --> 00:03:18.781 so.  
NOTE Confidence: 0.86102873  
00:03:18.781 --> 00:03:20.950 With that I will turn it over to you,  
NOTE Confidence: 0.86102873  
00:03:20.950 --> 00:03:21.160 Chris.  
NOTE Confidence: 0.8669459  
00:03:22.210 --> 00:03:25.890 OK, thank you for this invitation. Let me.  
NOTE Confidence: 0.8669459  
00:03:25.890 --> 00:03:28.970 I'll go ahead and share my screen here.  
NOTE Confidence: 0.83299416  
00:03:32.760 --> 00:03:36.480 OK, can everyone see that OK?  
NOTE Confidence: 0.83299416  
00:03:36.480 --> 00:03:39.427 OK, yeah, thank you again Lauren for  
NOTE Confidence: 0.83299416  
00:03:39.427 --> 00:03:41.769 the opportunity to present here.  
NOTE Confidence: 0.83299416  
00:03:41.770 --> 00:03:44.678 As Lauren mentioned my.  
NOTE Confidence: 0.83299416  
00:03:44.680 --> 00:03:46.468 My research focus generally  
NOTE Confidence: 0.83299416  
00:03:46.468 --> 00:03:47.809 encompasses the bidirectional  
NOTE Confidence: 0.83299416  
00:03:47.809 --> 00:03:49.530 relationship between sleep and  
NOTE Confidence: 0.83299416  
00:03:49.530 --> 00:03:51.125 physical activity and with my  
NOTE Confidence: 0.83299416  
00:03:51.125 --> 00:03:52.890 background PhD in exercise science,  
NOTE Confidence: 0.83299416  
00:03:52.890 --> 00:03:54.850 postdoctoral training and Sleep Medicine,  
NOTE Confidence: 0.83299416  
00:03:54.850 --> 00:03:56.998 I sort of have one foot

NOTE Confidence: 0.83299416

00:03:56.998 --> 00:03:59.150 in both of those fields.

NOTE Confidence: 0.899884

00:04:02.100 --> 00:04:03.773 Today though, I will not be talking

NOTE Confidence: 0.899884

00:04:03.773 --> 00:04:05.480 about sleep and exercise in general.

NOTE Confidence: 0.899884

00:04:05.480 --> 00:04:07.185 I'll be talking a little

NOTE Confidence: 0.899884

00:04:07.185 --> 00:04:08.549 bit more specifically about.

NOTE Confidence: 0.899884

00:04:08.550 --> 00:04:10.410 The importance of sleep for

NOTE Confidence: 0.899884

00:04:10.410 --> 00:04:11.526 optimizing athletic performance.

NOTE Confidence: 0.899884

00:04:11.530 --> 00:04:14.956 So this is an area that.

NOTE Confidence: 0.899884

00:04:14.960 --> 00:04:17.306 I don't have too much current

NOTE Confidence: 0.899884

00:04:17.306 --> 00:04:19.820 research going on on this topic,

NOTE Confidence: 0.899884

00:04:19.820 --> 00:04:22.124 but again, with my background with

NOTE Confidence: 0.899884

00:04:22.124 --> 00:04:24.679 the disciplines that I interact with,

NOTE Confidence: 0.899884

00:04:24.680 --> 00:04:27.704 this is a topic that is constantly

NOTE Confidence: 0.899884

00:04:27.704 --> 00:04:29.995 discussed and I've always stayed

NOTE Confidence: 0.899884

00:04:29.995 --> 00:04:32.265 relatively on top of the.

NOTE Confidence: 0.899884



00:04:32.270 --> 00:04:34.826 The current literature so and I  
NOTE Confidence: 0.899884

00:04:34.826 --> 00:04:37.896 also find it just a topic that  
NOTE Confidence: 0.899884

00:04:37.896 --> 00:04:40.016 is to me very fascinating.  
NOTE Confidence: 0.899884

00:04:40.020 --> 00:04:43.506 So we just to move forward here.  
NOTE Confidence: 0.7827078

00:04:46.580 --> 00:04:51.396 I this is what doctor Tobias mentioned.  
NOTE Confidence: 0.7827078

00:04:51.400 --> 00:04:53.794 And I do not have any conflicts of interest.  
NOTE Confidence: 0.89962876

00:04:56.200 --> 00:04:59.780 So. As everyone knows here,  
NOTE Confidence: 0.89962876

00:04:59.780 --> 00:05:02.510 the topic of sleep in athletic  
NOTE Confidence: 0.89962876

00:05:02.601 --> 00:05:06.080 performance has really gained a lot of  
NOTE Confidence: 0.89962876

00:05:06.080 --> 00:05:09.102 popularity in recent years, so athletics.  
NOTE Confidence: 0.89962876

00:05:09.102 --> 00:05:11.898 Practitioners have long noted the importance  
NOTE Confidence: 0.89962876

00:05:11.898 --> 00:05:14.599 of optimizing training programs for  
NOTE Confidence: 0.89962876

00:05:14.599 --> 00:05:16.859 subsequent optimization of performance,  
NOTE Confidence: 0.89962876

00:05:16.860 --> 00:05:19.080 but only recently have practitioners  
NOTE Confidence: 0.89962876

00:05:19.080 --> 00:05:20.856 really begun to appreciate  
NOTE Confidence: 0.89962876

00:05:20.856 --> 00:05:22.890 the importance of recovery,

NOTE Confidence: 0.89962876

00:05:22.890 --> 00:05:26.817 or basically the 22 or so hours.

NOTE Confidence: 0.89962876

00:05:26.820 --> 00:05:29.996 Of the day that you spend not training

NOTE Confidence: 0.89962876

00:05:29.996 --> 00:05:32.401 and really sleep and nutrition

NOTE Confidence: 0.89962876

00:05:32.401 --> 00:05:34.936 are the most critical factors.

NOTE Confidence: 0.89962876

00:05:34.940 --> 00:05:36.744 Facilitating recovery and with

NOTE Confidence: 0.89962876

00:05:36.744 --> 00:05:39.450 appreciation of the importance of sleep.

NOTE Confidence: 0.89962876

00:05:39.450 --> 00:05:43.594 The research has tended to follow that.

NOTE Confidence: 0.89962876

00:05:43.600 --> 00:05:45.718 But as I'll show you here,

NOTE Confidence: 0.89962876

00:05:45.720 --> 00:05:46.698 that we still,

NOTE Confidence: 0.89962876

00:05:46.698 --> 00:05:48.980 there's still quite a bit to know

NOTE Confidence: 0.89962876

00:05:49.048 --> 00:05:51.544 quite a bit to learn about the impact

NOTE Confidence: 0.89962876

00:05:51.544 --> 00:05:53.869 of sleep on athletic performance.

NOTE Confidence: 0.89962876

00:05:53.870 --> 00:05:56.942 So here's just a brief outline

NOTE Confidence: 0.89962876

00:05:56.942 --> 00:05:59.450 of what I will be.

NOTE Confidence: 0.89962876

00:05:59.450 --> 00:06:02.482 Covering over the next 40 or so minutes

NOTE Confidence: 0.89962876

00:06:02.482 --> 00:06:06.045 and at the end I will obviously welcome

NOTE Confidence: 0.89962876

00:06:06.045 --> 00:06:09.018 any questions that you may may have.

NOTE Confidence: 0.8292179

00:06:11.420 --> 00:06:15.004 So I usually top talk on this topic.

NOTE Confidence: 0.8292179

00:06:15.010 --> 00:06:16.888 Sorry to interrupt.

NOTE Confidence: 0.8292179

00:06:16.888 --> 00:06:21.270 You probably want to share screen in.

NOTE Confidence: 0.8292179

00:06:21.270 --> 00:06:23.496 For I don't know is everybody else,

NOTE Confidence: 0.8292179

00:06:23.500 --> 00:06:25.615 is anyone else seeing I'm

NOTE Confidence: 0.8292179

00:06:25.615 --> 00:06:27.730 seeing you as larger than.

NOTE Confidence: 0.8292179

00:06:27.730 --> 00:06:28.588 The slides themselves.

NOTE Confidence: 0.8292179

00:06:28.588 --> 00:06:30.018 Oh, maybe that's just me.

NOTE Confidence: 0.8292179

00:06:30.020 --> 00:06:31.730 I was able to fix it.

NOTE Confidence: 0.8292179

00:06:31.730 --> 00:06:33.160 Never mind keep continue here.

NOTE Confidence: 0.8292179

00:06:33.160 --> 00:06:34.590 I was like Oh no.

NOTE Confidence: 0.8368709

00:06:34.590 --> 00:06:39.290 'cause I don't know how to fix that one, OK?

NOTE Confidence: 0.8368709

00:06:39.290 --> 00:06:41.446 So I usually talk on this topic

NOTE Confidence: 0.8368709

00:06:41.446 --> 00:06:43.668 to audiences who don't really have

NOTE Confidence: 0.8368709

00:06:43.668 --> 00:06:45.713 much expertise in Sleep Medicine,

NOTE Confidence: 0.8368709

00:06:45.720 --> 00:06:48.512 so I usually begin with a few slides

NOTE Confidence: 0.8368709

00:06:48.512 --> 00:06:51.067 just priming the audience on on sleep,

NOTE Confidence: 0.8368709

00:06:51.070 --> 00:06:53.660 and specifically how sleep is.

NOTE Confidence: 0.8368709

00:06:53.660 --> 00:06:55.718 Is really an active state that prepares

NOTE Confidence: 0.8368709

00:06:55.718 --> 00:06:57.749 our bodies for optimal functioning.

NOTE Confidence: 0.8368709

00:06:57.750 --> 00:06:59.295 Now. I obviously don't need

NOTE Confidence: 0.8368709

00:06:59.295 --> 00:07:01.500 to do that for this audience,

NOTE Confidence: 0.8368709

00:07:01.500 --> 00:07:03.768 but I did want to emphasize how

NOTE Confidence: 0.8368709

00:07:03.768 --> 00:07:05.517 sleep is really critical for

NOTE Confidence: 0.8368709

00:07:05.517 --> 00:07:07.635 both the brain and the body.

NOTE Confidence: 0.8368709

00:07:07.640 --> 00:07:08.788 So for the brain,

NOTE Confidence: 0.8368709

00:07:08.788 --> 00:07:10.223 sleep plays an essential role

NOTE Confidence: 0.8368709

00:07:10.223 --> 00:07:12.068 in both memory consolidation.

NOTE Confidence: 0.8368709

00:07:12.070 --> 00:07:12.752 More recently,

NOTE Confidence: 0.8368709

00:07:12.752 --> 00:07:14.798 we've learned the importance of sleep  
NOTE Confidence: 0.8368709

00:07:14.798 --> 00:07:16.531 for clearing out metabolic byproducts  
NOTE Confidence: 0.8368709

00:07:16.531 --> 00:07:18.553 in the brain, but also, it's.  
NOTE Confidence: 0.8368709

00:07:18.553 --> 00:07:20.599 It's critically important for the body.  
NOTE Confidence: 0.8368709

00:07:20.600 --> 00:07:22.987 It's when multiple body systems are restored,  
NOTE Confidence: 0.8368709

00:07:22.990 --> 00:07:24.002 including the.  
NOTE Confidence: 0.8368709

00:07:24.002 --> 00:07:26.026 Nervous system, muscular system.  
NOTE Confidence: 0.8368709

00:07:26.030 --> 00:07:29.494 Immune endocrine skeletal systems.  
NOTE Confidence: 0.8368709

00:07:29.494 --> 00:07:30.360 Anne.  
NOTE Confidence: 0.8368709

00:07:30.360 --> 00:07:32.271 But it also serves as a critical  
NOTE Confidence: 0.8368709

00:07:32.271 --> 00:07:33.860 period for energy conservation.  
NOTE Confidence: 0.8368709

00:07:33.860 --> 00:07:35.775 It's when energy stores are  
NOTE Confidence: 0.8368709

00:07:35.775 --> 00:07:38.040 built up for the subsequent day.  
NOTE Confidence: 0.8368709

00:07:38.040 --> 00:07:39.342 So even though.  
NOTE Confidence: 0.8368709

00:07:39.342 --> 00:07:40.210 You know,  
NOTE Confidence: 0.8368709

00:07:40.210 --> 00:07:41.965 many people still consider sleep

NOTE Confidence: 0.8368709

00:07:41.965 --> 00:07:44.489 to be this passive state where we

NOTE Confidence: 0.8368709

00:07:44.489 --> 00:07:46.249 go offline and nothing happens.

NOTE Confidence: 0.8368709

00:07:46.250 --> 00:07:48.380 We as a Sleep Medicine field,

NOTE Confidence: 0.8368709

00:07:48.380 --> 00:07:50.790 know that this couldn't be

NOTE Confidence: 0.8368709

00:07:50.790 --> 00:07:52.718 further from the truth.

NOTE Confidence: 0.8368709

00:07:52.720 --> 00:07:53.530 Michael Grandner,

NOTE Confidence: 0.8368709

00:07:53.530 --> 00:07:55.960 researcher who most of you probably

NOTE Confidence: 0.8368709

00:07:55.960 --> 00:07:58.310 know and who I will be mentioning

NOTE Confidence: 0.8368709

00:07:58.310 --> 00:08:00.240 it a couple of other stops.

NOTE Confidence: 0.8368709

00:08:00.240 --> 00:08:01.314 In this presentation.

NOTE Confidence: 0.8368709

00:08:01.314 --> 00:08:02.388 He's really led.

NOTE Confidence: 0.8368709

00:08:02.390 --> 00:08:05.099 The charge is getting the NCAA to

NOTE Confidence: 0.8368709

00:08:05.099 --> 00:08:06.931 recognize the importance of sleep

NOTE Confidence: 0.8368709

00:08:06.931 --> 00:08:09.031 for their athletes and he just has

NOTE Confidence: 0.8368709

00:08:09.031 --> 00:08:11.338 a quote that I absolutely love.

NOTE Confidence: 0.8368709

00:08:11.340 --> 00:08:14.196 Rather than being a passive process of rest.

NOTE Confidence: 0.8368709

00:08:14.200 --> 00:08:16.706 Sleep is an active state of rebuilding,

NOTE Confidence: 0.8368709

00:08:16.710 --> 00:08:18.478 repair, reorganization and regeneration,

NOTE Confidence: 0.8368709

00:08:18.478 --> 00:08:21.130 and I think that just really

NOTE Confidence: 0.8368709

00:08:21.194 --> 00:08:23.050 emphasizes the relevance of

NOTE Confidence: 0.8368709

00:08:23.050 --> 00:08:24.906 sleep to athletic performance.

NOTE Confidence: 0.8368709

00:08:24.910 --> 00:08:28.054 So in general, how well do athletes sleep?

NOTE Confidence: 0.8368709

00:08:28.060 --> 00:08:30.030 So as Doctor Tobias mentioned,

NOTE Confidence: 0.8368709

00:08:30.030 --> 00:08:32.190 my primary area of interest is

NOTE Confidence: 0.8368709

00:08:32.190 --> 00:08:34.435 really in the impact of physical

NOTE Confidence: 0.8368709

00:08:34.435 --> 00:08:37.004 activity on sleep and in general we

NOTE Confidence: 0.8368709

00:08:37.004 --> 00:08:39.487 know that exercise improves sleep.

NOTE Confidence: 0.8368709

00:08:39.490 --> 00:08:42.298 So you would think.

NOTE Confidence: 0.8368709

00:08:42.300 --> 00:08:42.670 Athletes,

NOTE Confidence: 0.8368709

00:08:42.670 --> 00:08:45.260 they get more exercise than mostly everyone,

NOTE Confidence: 0.8368709

00:08:45.260 --> 00:08:48.590 so they should have the best sleep of all.

NOTE Confidence: 0.8368709

00:08:48.590 --> 00:08:50.810 But it's actually somewhat of a

NOTE Confidence: 0.8368709

00:08:50.810 --> 00:08:51.920 paradoxical relationship there,

NOTE Confidence: 0.8368709

00:08:51.920 --> 00:08:54.461 as you'll see athletes do not have

NOTE Confidence: 0.8368709

00:08:54.461 --> 00:08:56.730 better sleep than non athletes and

NOTE Confidence: 0.8368709

00:08:56.730 --> 00:08:59.320 in many cases it is quite disturbed.

NOTE Confidence: 0.85449713

00:09:01.880 --> 00:09:03.830 So anecdotal reports have always

NOTE Confidence: 0.85449713

00:09:03.830 --> 00:09:05.780 claimed a high prevalence of

NOTE Confidence: 0.85449713

00:09:05.849 --> 00:09:07.769 sleep disturbance in athletes,

NOTE Confidence: 0.85449713

00:09:07.770 --> 00:09:09.454 but there's been surprisingly

NOTE Confidence: 0.85449713

00:09:09.454 --> 00:09:10.296 little characterization.

NOTE Confidence: 0.85449713

00:09:10.300 --> 00:09:13.280 Obviously, patterns of this population.

NOTE Confidence: 0.85449713

00:09:13.280 --> 00:09:16.020 And of those available studies,

NOTE Confidence: 0.85449713

00:09:16.020 --> 00:09:19.764 most involve small sample sizes and

NOTE Confidence: 0.85449713

00:09:19.764 --> 00:09:22.930 relatively limited measures of sleep.

NOTE Confidence: 0.85449713

00:09:22.930 --> 00:09:26.437 The best evidence really comes from a

NOTE Confidence: 0.85449713



00:09:26.437 --> 00:09:29.734 recent systematic review led by Luke Gupta  
NOTE Confidence: 0.85449713

00:09:29.734 --> 00:09:32.630 and Kevin Morgan in at Loughborough an.  
NOTE Confidence: 0.85449713

00:09:32.630 --> 00:09:35.130 They summarize the findings across  
NOTE Confidence: 0.85449713

00:09:35.130 --> 00:09:37.630 37 different studies that focused  
NOTE Confidence: 0.85449713

00:09:37.710 --> 00:09:40.140 on characterizing sleep in elite.  
NOTE Confidence: 0.85449713

00:09:40.140 --> 00:09:41.883 Athletes. In general,  
NOTE Confidence: 0.85449713

00:09:41.883 --> 00:09:45.369 they found that athletes sleep a  
NOTE Confidence: 0.85449713

00:09:45.369 --> 00:09:48.770 similar duration to non athletes but.  
NOTE Confidence: 0.85449713

00:09:48.770 --> 00:09:50.940 Even though they sleep a similar duration,  
NOTE Confidence: 0.85449713

00:09:50.940 --> 00:09:53.100 the sleep that they do obtain seems to  
NOTE Confidence: 0.85449713

00:09:53.100 --> 00:09:55.826 be more fragmented, as evidenced by.  
NOTE Confidence: 0.85449713

00:09:55.826 --> 00:09:58.286 Lower sleep efficiency than expected  
NOTE Confidence: 0.85449713

00:09:58.286 --> 00:10:00.890 and higher sleep onset latency.  
NOTE Confidence: 0.85449713

00:10:00.890 --> 00:10:03.046 And that's I shown just Table 2  
NOTE Confidence: 0.85449713

00:10:03.046 --> 00:10:05.339 at the bottom left of this slide.  
NOTE Confidence: 0.85449713

00:10:05.340 --> 00:10:08.210 That sort of depicts that.

NOTE Confidence: 0.85449713  
00:10:08.210 --> 00:10:08.872 In addition,  
NOTE Confidence: 0.85449713  
00:10:08.872 --> 00:10:11.189 they found that nearly half of all  
NOTE Confidence: 0.85449713  
00:10:11.189 --> 00:10:13.473 athletes across these 37 studies self  
NOTE Confidence: 0.85449713  
00:10:13.473 --> 00:10:15.363 reported having poor sleep quality.  
NOTE Confidence: 0.85449713  
00:10:15.370 --> 00:10:17.330 According to the Pittsburgh  
NOTE Confidence: 0.85449713  
00:10:17.330 --> 00:10:18.800 Sleep Quality index.  
NOTE Confidence: 0.85449713  
00:10:18.800 --> 00:10:21.356 Again, that's on the bottom right  
NOTE Confidence: 0.85449713  
00:10:21.356 --> 00:10:23.060 portion of the slide.  
NOTE Confidence: 0.85449713  
00:10:23.060 --> 00:10:25.185 An complaints related to Assump  
NOTE Confidence: 0.85449713  
00:10:25.185 --> 00:10:26.885 insomnia were especially common,  
NOTE Confidence: 0.85449713  
00:10:26.890 --> 00:10:29.020 including as I mentioned before,  
NOTE Confidence: 0.85449713  
00:10:29.020 --> 00:10:30.298 long sleep latency,  
NOTE Confidence: 0.85449713  
00:10:30.298 --> 00:10:31.576 inefficient fragmented sleep,  
NOTE Confidence: 0.85449713  
00:10:31.580 --> 00:10:34.700 and then waking up feeling  
NOTE Confidence: 0.85449713  
00:10:34.700 --> 00:10:35.948 relatively unrefreshed.  
NOTE Confidence: 0.85449713

00:10:35.950 --> 00:10:37.820 This review also pointed out,  
NOTE Confidence: 0.85449713

00:10:37.820 --> 00:10:40.058 though that of the studies reviewed,  
NOTE Confidence: 0.85449713

00:10:40.060 --> 00:10:42.310 they generally were of poor quality.  
NOTE Confidence: 0.85449713

00:10:42.310 --> 00:10:44.180 Majority of studies were graded.  
NOTE Confidence: 0.85449713

00:10:44.180 --> 00:10:46.045 Actually is poor quality evidence  
NOTE Confidence: 0.85449713

00:10:46.045 --> 00:10:48.666 and only 5% were deemed high quality.  
NOTE Confidence: 0.85449713

00:10:48.666 --> 00:10:49.786 And, you know,  
NOTE Confidence: 0.85449713

00:10:49.786 --> 00:10:51.278 as I mentioned before,  
NOTE Confidence: 0.85449713

00:10:51.280 --> 00:10:53.765 the biggest flaws in most of these  
NOTE Confidence: 0.85449713

00:10:53.765 --> 00:10:55.769 studies were small sample sizes,  
NOTE Confidence: 0.85449713

00:10:55.770 --> 00:10:58.780 but also the lack of the control  
NOTE Confidence: 0.85449713

00:10:58.780 --> 00:11:01.529 condition control or comparison group.  
NOTE Confidence: 0.85449713

00:11:01.530 --> 00:11:02.184 So overall,  
NOTE Confidence: 0.85449713

00:11:02.184 --> 00:11:03.819 in addition to pointing out  
NOTE Confidence: 0.85449713

00:11:03.819 --> 00:11:05.824 the need for higher quality  
NOTE Confidence: 0.85449713

00:11:05.824 --> 00:11:08.209 characterization of sleep in athletes,

NOTE Confidence: 0.85449713

00:11:08.210 --> 00:11:10.262 this review really highlighted that the

NOTE Confidence: 0.85449713

00:11:10.262 --> 00:11:12.610 problem may not be insufficient sleep

NOTE Confidence: 0.85449713

00:11:12.610 --> 00:11:14.890 due to voluntary sleep curtailment,

NOTE Confidence: 0.85449713

00:11:14.890 --> 00:11:16.805 but rather disturbed or fragmented

NOTE Confidence: 0.85449713

00:11:16.805 --> 00:11:19.190 sleep that is the primary issue

NOTE Confidence: 0.85449713

00:11:19.190 --> 00:11:20.387 with most athletes.

NOTE Confidence: 0.825106

00:11:23.910 --> 00:11:26.563 So good is review generally focused just

NOTE Confidence: 0.825106

00:11:26.563 --> 00:11:29.101 on elite athletes without regard to age

NOTE Confidence: 0.825106

00:11:29.101 --> 00:11:31.672 Group an not too many studies actually

NOTE Confidence: 0.825106

00:11:31.672 --> 00:11:34.688 focus on collegiate student athletes, but.

NOTE Confidence: 0.825106

00:11:34.688 --> 00:11:36.720 Among specifically collegiate student

NOTE Confidence: 0.825106

00:11:36.720 --> 00:11:39.600 athletes, this might be where the highest

NOTE Confidence: 0.825106

00:11:39.600 --> 00:11:41.819 prevalence of poor sleep is seen.

NOTE Confidence: 0.825106

00:11:41.820 --> 00:11:43.740 If you think about it,

NOTE Confidence: 0.825106

00:11:43.740 --> 00:11:45.882 collegiate student athletes need to juggle

NOTE Confidence: 0.825106

00:11:45.882 --> 00:11:47.950 the demands of collegiate coursework,  
NOTE Confidence: 0.825106

00:11:47.950 --> 00:11:51.766 high demands on training, especially at.  
NOTE Confidence: 0.825106

00:11:51.770 --> 00:11:55.196 The more the higher levels,  
NOTE Confidence: 0.825106

00:11:55.196 --> 00:11:58.080 such as Division One, power five conferences.  
NOTE Confidence: 0.825106

00:11:58.080 --> 00:12:01.020 And then there's still college students,  
NOTE Confidence: 0.825106

00:12:01.020 --> 00:12:03.650 so relatively poor sleep hygiene  
NOTE Confidence: 0.825106

00:12:03.650 --> 00:12:05.754 habits are relatively common.  
NOTE Confidence: 0.825106

00:12:05.760 --> 00:12:08.766 So shown here on the left are the average  
NOTE Confidence: 0.825106

00:12:08.766 --> 00:12:11.697 sleep durations that were self reported by  
NOTE Confidence: 0.825106

00:12:11.697 --> 00:12:14.730 NCAA athletes from the 2016 goals survey,  
NOTE Confidence: 0.825106

00:12:14.730 --> 00:12:17.040 and these results are separated by  
NOTE Confidence: 0.825106

00:12:17.040 --> 00:12:19.345 athletic division of the NCAA and  
NOTE Confidence: 0.825106

00:12:19.345 --> 00:12:21.421 you can see that the prevalence  
NOTE Confidence: 0.825106

00:12:21.421 --> 00:12:23.483 of different sleep durations are  
NOTE Confidence: 0.825106

00:12:23.483 --> 00:12:25.648 pretty similar across Division 1,  
NOTE Confidence: 0.825106

00:12:25.650 --> 00:12:27.468 two and three.

NOTE Confidence: 0.825106

00:12:27.468 --> 00:12:30.498 But approximately half of all

NOTE Confidence: 0.825106

00:12:30.498 --> 00:12:31.710 athletes report.

NOTE Confidence: 0.825106

00:12:31.710 --> 00:12:34.966 Six or less hours of sleep at night

NOTE Confidence: 0.825106

00:12:34.966 --> 00:12:37.865 on average and with the mean being

NOTE Confidence: 0.825106

00:12:37.865 --> 00:12:41.368 around 6 1/4 hours of sleep per night.

NOTE Confidence: 0.825106

00:12:41.370 --> 00:12:43.410 So this amount of sleep is.

NOTE Confidence: 0.825106

00:12:43.410 --> 00:12:46.200 Really similar to what college students

NOTE Confidence: 0.825106

00:12:46.200 --> 00:12:49.204 generally report sleeping on average, but.

NOTE Confidence: 0.825106

00:12:49.204 --> 00:12:51.824 Within within those who studies

NOTE Confidence: 0.825106

00:12:51.824 --> 00:12:53.920 sleep enough like performance,

NOTE Confidence: 0.825106

00:12:53.920 --> 00:12:57.190 there is the assumption that athletes

NOTE Confidence: 0.825106

00:12:57.190 --> 00:13:00.690 need more sleep than non athletes.

NOTE Confidence: 0.825106

00:13:00.690 --> 00:13:01.472 In addition,

NOTE Confidence: 0.825106

00:13:01.472 --> 00:13:03.036 the Gold survey did.

NOTE Confidence: 0.84627473

00:13:05.140 --> 00:13:07.354 They did show that in addition

NOTE Confidence: 0.84627473

00:13:07.354 --> 00:13:09.560 to sub optimal sleep duration,  
NOTE Confidence: 0.84627473

00:13:09.560 --> 00:13:11.168 college athletes just oftentimes  
NOTE Confidence: 0.84627473

00:13:11.168 --> 00:13:12.776 have poor quality sleep.  
NOTE Confidence: 0.84627473

00:13:12.780 --> 00:13:15.318 Over 50% of athletes reported that  
NOTE Confidence: 0.84627473

00:13:15.318 --> 00:13:17.850 they felt rested upon awakening.  
NOTE Confidence: 0.84627473

00:13:17.850 --> 00:13:21.792 In the morning 3:00 or less days per week.  
NOTE Confidence: 0.84627473

00:13:21.800 --> 00:13:23.845 So overall, just a broadview  
NOTE Confidence: 0.84627473

00:13:23.845 --> 00:13:26.450 of the literature is that at  
NOTE Confidence: 0.84627473

00:13:26.450 --> 00:13:28.386 the elite professional level,  
NOTE Confidence: 0.84627473

00:13:28.390 --> 00:13:31.214 the issue seems to be much more likely  
NOTE Confidence: 0.84627473

00:13:31.214 --> 00:13:34.088 to be insomnia related symptoms,  
NOTE Confidence: 0.84627473

00:13:34.090 --> 00:13:36.730 whereas in contrast among non elite,  
NOTE Confidence: 0.84627473

00:13:36.730 --> 00:13:38.920 collegiate and high school athletes,  
NOTE Confidence: 0.84627473

00:13:38.920 --> 00:13:42.320 short sleep seems to be.  
NOTE Confidence: 0.84627473

00:13:42.320 --> 00:13:43.730 On average, the bigger issue.  
NOTE Confidence: 0.86611205

00:13:46.670 --> 00:13:48.680 It's important to note, though,

NOTE Confidence: 0.86611205

00:13:48.680 --> 00:13:51.074 that the prior couple of slides

NOTE Confidence: 0.86611205

00:13:51.074 --> 00:13:53.537 in which the prevalence of poor

NOTE Confidence: 0.86611205

00:13:53.537 --> 00:13:55.507 sleep there was was presented.

NOTE Confidence: 0.86611205

00:13:55.510 --> 00:13:57.520 Those represent disruption in an

NOTE Confidence: 0.86611205

00:13:57.520 --> 00:13:59.530 athlete's normal or typical sleep.

NOTE Confidence: 0.86611205

00:13:59.530 --> 00:14:01.540 It's even more common, though,

NOTE Confidence: 0.86611205

00:14:01.540 --> 00:14:04.264 for athletes to experience sleep disturbance

NOTE Confidence: 0.86611205

00:14:04.264 --> 00:14:06.970 immediately prior to a competition.

NOTE Confidence: 0.86611205

00:14:06.970 --> 00:14:09.030 So this was I think,

NOTE Confidence: 0.86611205

00:14:09.030 --> 00:14:11.515 really well demonstrated in in a recent

NOTE Confidence: 0.86611205

00:14:11.515 --> 00:14:13.969 study of elite Australian athletes.

NOTE Confidence: 0.86611205

00:14:13.970 --> 00:14:17.371 And in that sample 64% of the athletes

NOTE Confidence: 0.86611205

00:14:17.371 --> 00:14:19.159 surveyed reported experiencing worse

NOTE Confidence: 0.86611205

00:14:19.159 --> 00:14:21.644 sleep immediately prior to an important

NOTE Confidence: 0.86611205

00:14:21.644 --> 00:14:23.444 competition within the past year.

NOTE Confidence: 0.86611205



00:14:23.450 --> 00:14:27.158 And as you can see from these two graphs,  
NOTE Confidence: 0.86611205

00:14:27.160 --> 00:14:29.866 most of the time the problem  
NOTE Confidence: 0.86611205

00:14:29.866 --> 00:14:32.899 was an inability to fall asleep.  
NOTE Confidence: 0.86611205

00:14:32.900 --> 00:14:35.462 And most often this difficulty sleeping  
NOTE Confidence: 0.86611205

00:14:35.462 --> 00:14:38.257 was attributed to thoughts and nervousness  
NOTE Confidence: 0.86611205

00:14:38.257 --> 00:14:40.285 about the upcoming competition.  
NOTE Confidence: 0.86007977

00:14:43.200 --> 00:14:44.775 So there's a variety of  
NOTE Confidence: 0.86007977

00:14:44.775 --> 00:14:46.845 factors that at play that could  
NOTE Confidence: 0.86007977

00:14:46.845 --> 00:14:48.985 predispose athletes to poor sleep.  
NOTE Confidence: 0.86007977

00:14:48.990 --> 00:14:51.132 Some of these factors are going  
NOTE Confidence: 0.86007977

00:14:51.132 --> 00:14:52.990 to be directly relevant to  
NOTE Confidence: 0.86007977

00:14:52.990 --> 00:14:54.775 the sport they participate in,  
NOTE Confidence: 0.86007977

00:14:54.780 --> 00:14:57.836 while others seem to be seem to be  
NOTE Confidence: 0.86007977

00:14:57.836 --> 00:15:00.718 more related to the individual itself.  
NOTE Confidence: 0.86007977

00:15:00.720 --> 00:15:03.192 So this schematic is from a  
NOTE Confidence: 0.86007977

00:15:03.192 --> 00:15:04.428 recently published consensus

NOTE Confidence: 0.86007977

00:15:04.428 --> 00:15:06.530 statement on Sleeping Lead athletes,

NOTE Confidence: 0.86007977

00:15:06.530 --> 00:15:09.055 and I think it characterizes

NOTE Confidence: 0.86007977

00:15:09.055 --> 00:15:11.580 these risk factors really well.

NOTE Confidence: 0.86007977

00:15:11.580 --> 00:15:16.036 So first we have non sport or individual

NOTE Confidence: 0.86007977

00:15:16.036 --> 00:15:19.669 factors on the periphery in blue.

NOTE Confidence: 0.86007977

00:15:19.670 --> 00:15:22.610 And there's just numerous

NOTE Confidence: 0.86007977

00:15:22.610 --> 00:15:25.550 external non sport influences.

NOTE Confidence: 0.86007977

00:15:25.550 --> 00:15:27.518 That impact in athlete Ann may

NOTE Confidence: 0.86007977

00:15:27.518 --> 00:15:29.610 predispose them to sleep disturbance,

NOTE Confidence: 0.86007977

00:15:29.610 --> 00:15:31.450 so most athletes aren't well

NOTE Confidence: 0.86007977

00:15:31.450 --> 00:15:32.186 paid professionals,

NOTE Confidence: 0.86007977

00:15:32.190 --> 00:15:34.920 so they have to juggle other family

NOTE Confidence: 0.86007977

00:15:34.920 --> 00:15:36.486 social commitments that often

NOTE Confidence: 0.86007977

00:15:36.486 --> 00:15:38.466 come at the expense of sleep,

NOTE Confidence: 0.86007977

00:15:38.470 --> 00:15:41.417 such as school part time or full

NOTE Confidence: 0.86007977

00:15:41.417 --> 00:15:43.330 time job caretaking duties.

NOTE Confidence: 0.86007977

00:15:43.330 --> 00:15:44.200 In addition,

NOTE Confidence: 0.86007977

00:15:44.200 --> 00:15:45.505 individual characteristics may

NOTE Confidence: 0.86007977

00:15:45.505 --> 00:15:47.732 play a significant role, so.

NOTE Confidence: 0.86007977

00:15:47.732 --> 00:15:48.696 In fact,

NOTE Confidence: 0.86007977

00:15:48.696 --> 00:15:51.106 the very attributes that may

NOTE Confidence: 0.86007977

00:15:51.106 --> 00:15:53.708 predispose one to XLS an athlete,

NOTE Confidence: 0.86007977

00:15:53.710 --> 00:15:54.910 such as perfectionism,

NOTE Confidence: 0.86007977

00:15:54.910 --> 00:15:57.721 attention to detail, strong work ethic.

NOTE Confidence: 0.86007977

00:15:57.721 --> 00:16:00.406 They also may predispose an

NOTE Confidence: 0.86007977

00:16:00.406 --> 00:16:02.430 athlete to insomnia.

NOTE Confidence: 0.86007977

00:16:02.430 --> 00:16:04.572 And these could also include factors

NOTE Confidence: 0.86007977

00:16:04.572 --> 00:16:06.485 like chronotype and sleep need

NOTE Confidence: 0.86007977

00:16:06.485 --> 00:16:08.189 that are highly individualistic.

NOTE Confidence: 0.86007977

00:16:08.190 --> 00:16:08.633 Finally,

NOTE Confidence: 0.86007977

00:16:08.633 --> 00:16:10.848 the athletes lifestyle choices and

NOTE Confidence: 0.86007977

00:16:10.848 --> 00:16:13.008 attitudes about the importance of

NOTE Confidence: 0.86007977

00:16:13.008 --> 00:16:15.269 sleep likely play a role in their

NOTE Confidence: 0.86007977

00:16:15.269 --> 00:16:16.639 predisposition to poor sleep,

NOTE Confidence: 0.86007977

00:16:16.640 --> 00:16:18.336 even though most athletes.

NOTE Confidence: 0.86007977

00:16:18.336 --> 00:16:21.390 Now know about the importance of sleep.

NOTE Confidence: 0.86007977

00:16:21.390 --> 00:16:22.158 For many,

NOTE Confidence: 0.86007977

00:16:22.158 --> 00:16:24.846 it's still not a high priority until

NOTE Confidence: 0.86007977

00:16:24.846 --> 00:16:27.148 right before a big competition.

NOTE Confidence: 0.86007977

00:16:27.150 --> 00:16:28.400 Now, on the other hand,

NOTE Confidence: 0.86007977

00:16:28.400 --> 00:16:30.155 sport related factors which are

NOTE Confidence: 0.86007977

00:16:30.155 --> 00:16:33.058 shown here on the inner circle in orange.

NOTE Confidence: 0.86007977

00:16:33.060 --> 00:16:35.274 Those are easier to identify and

NOTE Confidence: 0.86007977

00:16:35.274 --> 00:16:37.370 they largely revolve around training,

NOTE Confidence: 0.86007977

00:16:37.370 --> 00:16:39.728 travel and competition.

NOTE Confidence: 0.86007977

00:16:39.730 --> 00:16:40.176 Specifically,

NOTE Confidence: 0.86007977

00:16:40.176 --> 00:16:42.852 high training loads in poorly poorly  
NOTE Confidence: 0.86007977

00:16:42.852 --> 00:16:44.800 timed training training sessions,  
NOTE Confidence: 0.86007977

00:16:44.800 --> 00:16:46.644 so either excessively early  
NOTE Confidence: 0.86007977

00:16:46.644 --> 00:16:48.949 or late in the day.  
NOTE Confidence: 0.86007977

00:16:48.950 --> 00:16:50.794 Those may predispose predispose  
NOTE Confidence: 0.86007977

00:16:50.794 --> 00:16:53.099 athlete to poor sleep well,  
NOTE Confidence: 0.86007977

00:16:53.100 --> 00:16:55.450 while the experience of competition  
NOTE Confidence: 0.86007977

00:16:55.450 --> 00:16:58.351 and with it coming potentially late  
NOTE Confidence: 0.86007977

00:16:58.351 --> 00:17:00.701 competition times travel the unfamiliar  
NOTE Confidence: 0.86007977

00:17:00.701 --> 00:17:04.158 settings in which one is required to sleep.  
NOTE Confidence: 0.86007977

00:17:04.160 --> 00:17:06.926 Those may just add onto this  
NOTE Confidence: 0.86007977

00:17:06.926 --> 00:17:08.309 poor sleep issue.  
NOTE Confidence: 0.86007977

00:17:08.310 --> 00:17:10.700 Now the relevance of these.  
NOTE Confidence: 0.86007977

00:17:10.700 --> 00:17:13.871 Various factors are going to differ according  
NOTE Confidence: 0.86007977

00:17:13.871 --> 00:17:17.098 to the individual and the individual sport.  
NOTE Confidence: 0.86007977

00:17:17.100 --> 00:17:18.405 So for instance,

NOTE Confidence: 0.86007977

00:17:18.405 --> 00:17:20.580 swimming is notorious for early

NOTE Confidence: 0.86007977

00:17:20.580 --> 00:17:22.130 morning training sessions,

NOTE Confidence: 0.86007977

00:17:22.130 --> 00:17:24.280 whereas professional.

NOTE Confidence: 0.86007977

00:17:24.280 --> 00:17:26.195 Basketball players may be more

NOTE Confidence: 0.86007977

00:17:26.195 --> 00:17:28.622 likely to engage in evening or

NOTE Confidence: 0.86007977

00:17:28.622 --> 00:17:30.366 even later night competitions,

NOTE Confidence: 0.86007977

00:17:30.370 --> 00:17:33.205 and these factors can act in isolation,

NOTE Confidence: 0.86007977

00:17:33.210 --> 00:17:34.830 or they can interact.

NOTE Confidence: 0.86007977

00:17:34.830 --> 00:17:36.045 So for instance,

NOTE Confidence: 0.86007977

00:17:36.050 --> 00:17:38.510 an athlete who may normally be

NOTE Confidence: 0.86007977

00:17:38.510 --> 00:17:41.017 predisposed to insomnia may be able

NOTE Confidence: 0.86007977

00:17:41.017 --> 00:17:43.393 to sleep fine during the offseason

NOTE Confidence: 0.86007977

00:17:43.393 --> 00:17:45.389 when training loads are lower,

NOTE Confidence: 0.86007977

00:17:45.390 --> 00:17:48.580 travel is minimal, but then.

NOTE Confidence: 0.86007977

00:17:48.580 --> 00:17:50.675 The insomnia may manifest itself

NOTE Confidence: 0.86007977

00:17:50.675 --> 00:17:52.770 during the competitive season when  
NOTE Confidence: 0.86007977

00:17:52.840 --> 00:17:54.685 training loads are much higher  
NOTE Confidence: 0.86007977

00:17:54.685 --> 00:17:56.530 in competition and travel is  
NOTE Confidence: 0.86007977

00:17:56.600 --> 00:17:57.788 much more frequent.  
NOTE Confidence: 0.86007977

00:17:57.790 --> 00:17:58.590 So overall,  
NOTE Confidence: 0.86007977

00:17:58.590 --> 00:18:00.590 this schematic really just emphasizes  
NOTE Confidence: 0.86007977

00:18:00.590 --> 00:18:02.549 the numerous factors that could  
NOTE Confidence: 0.86007977

00:18:02.549 --> 00:18:04.649 contribute to poor sleep and athletes.  
NOTE Confidence: 0.8512923

00:18:07.850 --> 00:18:10.475 So we see that poor sleep is  
NOTE Confidence: 0.8512923

00:18:10.475 --> 00:18:11.600 prevalent among athletes,  
NOTE Confidence: 0.8512923

00:18:11.600 --> 00:18:13.784 and the reason that why that's  
NOTE Confidence: 0.8512923

00:18:13.784 --> 00:18:17.220 such a big deal is that poor or  
NOTE Confidence: 0.8512923

00:18:17.220 --> 00:18:19.120 insufficient sleep could impact.  
NOTE Confidence: 0.8512923

00:18:19.120 --> 00:18:22.784 Athletic performance. So in general,  
NOTE Confidence: 0.8512923

00:18:22.784 --> 00:18:25.010 there is the expectation that poor sleep,  
NOTE Confidence: 0.8512923

00:18:25.010 --> 00:18:26.930 which is manifested in a variety

NOTE Confidence: 0.8512923

00:18:26.930 --> 00:18:29.458 of ways as shown here on the slide,

NOTE Confidence: 0.8512923

00:18:29.460 --> 00:18:31.450 could impair multiple domains that

NOTE Confidence: 0.8512923

00:18:31.450 --> 00:18:33.440 are relevant to athletic performance.

NOTE Confidence: 0.8512923

00:18:33.440 --> 00:18:35.416 However, the existing experimental

NOTE Confidence: 0.8512923

00:18:35.416 --> 00:18:37.886 literature really is primarily focused

NOTE Confidence: 0.8512923

00:18:37.886 --> 00:18:40.685 on sleep restriction or even outright

NOTE Confidence: 0.8512923

00:18:40.685 --> 00:18:42.925 total sleep deprivation and there's

NOTE Confidence: 0.8512923

00:18:42.995 --> 00:18:45.585 really an across the board need for

NOTE Confidence: 0.8512923

00:18:45.585 --> 00:18:47.656 quality research that examines athletic

NOTE Confidence: 0.8512923

00:18:47.656 --> 00:18:49.568 performance outcomes under conditions

NOTE Confidence: 0.8512923

00:18:49.568 --> 00:18:51.916 of more realistic conditions of

NOTE Confidence: 0.8512923

00:18:51.916 --> 00:18:53.766 poor sleep that athletes experience.

NOTE Confidence: 0.83787227

00:18:55.920 --> 00:18:58.528 So what is the actual evidence that links

NOTE Confidence: 0.83787227

00:18:58.528 --> 00:19:01.320 poor sleep to impaired athletic performance?

NOTE Confidence: 0.83787227

00:19:01.320 --> 00:19:04.794 Well, as I alluded to on the last slide,

NOTE Confidence: 0.83787227



00:19:04.800 --> 00:19:06.676 there's there's actually surprisingly  
NOTE Confidence: 0.83787227

00:19:06.676 --> 00:19:08.083 minimal literature that's  
NOTE Confidence: 0.83787227

00:19:08.083 --> 00:19:10.160 focused on realistic sleep loss.  
NOTE Confidence: 0.83787227

00:19:10.160 --> 00:19:13.254 In fact, many of the early studies  
NOTE Confidence: 0.83787227

00:19:13.254 --> 00:19:15.533 focused on complete sleep deprivation  
NOTE Confidence: 0.83787227

00:19:15.533 --> 00:19:18.585 of 24 to 60 hours of duration.  
NOTE Confidence: 0.83787227

00:19:18.590 --> 00:19:21.740 And then they examined how that  
NOTE Confidence: 0.83787227

00:19:21.740 --> 00:19:23.315 impacted different exercise  
NOTE Confidence: 0.83787227

00:19:23.315 --> 00:19:25.640 parameters or performance markers.  
NOTE Confidence: 0.83787227

00:19:25.640 --> 00:19:28.594 So I didn't even really include those  
NOTE Confidence: 0.83787227

00:19:28.594 --> 00:19:31.126 in this talk, just because that's  
NOTE Confidence: 0.83787227

00:19:31.126 --> 00:19:33.236 not realistic for most athletes.  
NOTE Confidence: 0.83787227

00:19:33.240 --> 00:19:35.802 Now, among studies that have examined  
NOTE Confidence: 0.83787227

00:19:35.802 --> 00:19:38.299 more realistic scenarios of sleep loss,  
NOTE Confidence: 0.83787227

00:19:38.300 --> 00:19:40.284 they've shown relatively minimal  
NOTE Confidence: 0.83787227

00:19:40.284 --> 00:19:42.764 changes in performance with a

NOTE Confidence: 0.83787227

00:19:42.764 --> 00:19:44.987 single night of reduced sleep.

NOTE Confidence: 0.83787227

00:19:44.990 --> 00:19:46.385 So somewhat consistently,

NOTE Confidence: 0.83787227

00:19:46.385 --> 00:19:48.710 studies have shown that simple

NOTE Confidence: 0.83787227

00:19:48.710 --> 00:19:50.536 performance metrics involving large

NOTE Confidence: 0.83787227

00:19:50.536 --> 00:19:53.014 muscle groups so gross motor function,

NOTE Confidence: 0.83787227

00:19:53.020 --> 00:19:54.800 such as muscular strength,

NOTE Confidence: 0.83787227

00:19:54.800 --> 00:19:57.490 power output, and view to Max.

NOTE Confidence: 0.83787227

00:19:57.490 --> 00:20:00.190 Aren't affected that much by a.

NOTE Confidence: 0.83787227

00:20:00.190 --> 00:20:01.990 Single night of sleep loss.

NOTE Confidence: 0.83787227

00:20:01.990 --> 00:20:02.523 Again,

NOTE Confidence: 0.83787227

00:20:02.523 --> 00:20:06.254 the evidence is is very equivocal there.

NOTE Confidence: 0.83787227

00:20:06.260 --> 00:20:09.347 So what does seem to be impacted?

NOTE Confidence: 0.83787227

00:20:09.350 --> 00:20:10.520 Well, for one,

NOTE Confidence: 0.83787227

00:20:10.520 --> 00:20:13.250 in contrast to large muscle group activities,

NOTE Confidence: 0.83787227

00:20:13.250 --> 00:20:15.704 performance of the more complex or

NOTE Confidence: 0.83787227

00:20:15.704 --> 00:20:18.130 fine motor skills may be impacted  
NOTE Confidence: 0.83787227

00:20:18.130 --> 00:20:20.266 by one night of sleep loss.  
NOTE Confidence: 0.83787227

00:20:20.270 --> 00:20:22.526 So small studies have shown that  
NOTE Confidence: 0.83787227

00:20:22.526 --> 00:20:24.560 sport specific skills of tennis,  
NOTE Confidence: 0.83787227

00:20:24.560 --> 00:20:25.502 darts, handball,  
NOTE Confidence: 0.83787227

00:20:25.502 --> 00:20:27.857 they all are significantly affected  
NOTE Confidence: 0.83787227

00:20:27.857 --> 00:20:31.410 by even a single night of sleep loss.  
NOTE Confidence: 0.83787227

00:20:31.410 --> 00:20:31.804 Also,  
NOTE Confidence: 0.83787227

00:20:31.804 --> 00:20:33.774 activities involving a high cognitive  
NOTE Confidence: 0.83787227

00:20:33.774 --> 00:20:37.259 load or the need for precise decision-making.  
NOTE Confidence: 0.83787227

00:20:37.260 --> 00:20:39.960 They may also be impacted as  
NOTE Confidence: 0.83787227

00:20:39.960 --> 00:20:41.760 reaction time is affected,  
NOTE Confidence: 0.83787227

00:20:41.760 --> 00:20:44.910 regulation of mood and emotion is impaired,  
NOTE Confidence: 0.83787227

00:20:44.910 --> 00:20:48.039 but the biggest impact of a single  
NOTE Confidence: 0.83787227

00:20:48.039 --> 00:20:51.656 night of sleep loss may be on repeated,  
NOTE Confidence: 0.83787227

00:20:51.660 --> 00:20:52.518 submaximal efforts.

NOTE Confidence: 0.83787227

00:20:52.518 --> 00:20:55.092 So studies have shown that one's

NOTE Confidence: 0.83787227

00:20:55.092 --> 00:20:57.059 perception of effort forgiven.

NOTE Confidence: 0.83787227

00:20:57.060 --> 00:20:59.976 Submaximal task is going to be

NOTE Confidence: 0.83787227

00:20:59.976 --> 00:21:01.920 higher with restricted sleep.

NOTE Confidence: 0.83787227

00:21:01.920 --> 00:21:04.545 And also accompanied by reduced

NOTE Confidence: 0.83787227

00:21:04.545 --> 00:21:05.595 pain tolerance.

NOTE Confidence: 0.83787227

00:21:05.600 --> 00:21:06.320 But overall,

NOTE Confidence: 0.83787227

00:21:06.320 --> 00:21:08.480 when you consider the existing evidence

NOTE Confidence: 0.83787227

00:21:08.480 --> 00:21:10.520 regarding the effect of one night

NOTE Confidence: 0.83787227

00:21:10.520 --> 00:21:12.095 of reduced sleep on performance,

NOTE Confidence: 0.83787227

00:21:12.100 --> 00:21:14.277 and you combine that with the fact

NOTE Confidence: 0.83787227

00:21:14.277 --> 00:21:16.400 that most athletes do sleep poorly

NOTE Confidence: 0.83787227

00:21:16.400 --> 00:21:17.908 the night before competition,

NOTE Confidence: 0.83787227

00:21:17.910 --> 00:21:20.268 one thing I always tell the

NOTE Confidence: 0.83787227

00:21:20.268 --> 00:21:22.600 efforts I work with is that.

NOTE Confidence: 0.83787227

00:21:22.600 --> 00:21:24.110 If you sleep poorly the  
NOTE Confidence: 0.83787227

00:21:24.110 --> 00:21:25.016 night before competition,  
NOTE Confidence: 0.83787227

00:21:25.020 --> 00:21:26.540 do not worry about it.  
NOTE Confidence: 0.8509262

00:21:29.110 --> 00:21:31.900 So as I talked about in the last slide,  
NOTE Confidence: 0.8509262

00:21:31.900 --> 00:21:33.694 you know contrast in gross motor  
NOTE Confidence: 0.8509262

00:21:33.694 --> 00:21:35.620 function versus more fine motor skills.  
NOTE Confidence: 0.8509262

00:21:35.620 --> 00:21:37.790 There does seem to be a difference,  
NOTE Confidence: 0.8509262

00:21:37.790 --> 00:21:40.448 so I wanted to just highlight  
NOTE Confidence: 0.8509262

00:21:40.448 --> 00:21:43.290 this study here that focused on.  
NOTE Confidence: 0.8509262

00:21:43.290 --> 00:21:45.972 A simple sample of collegiate tennis  
NOTE Confidence: 0.8509262

00:21:45.972 --> 00:21:48.500 players and tennis serve accuracy.  
NOTE Confidence: 0.8509262

00:21:48.500 --> 00:21:50.060 So they actually conducted two  
NOTE Confidence: 0.8509262

00:21:50.060 --> 00:21:51.620 different studies in this publication.  
NOTE Confidence: 0.8509262

00:21:51.620 --> 00:21:53.895 In the first, they looked the effects  
NOTE Confidence: 0.8509262

00:21:53.895 --> 00:21:56.730 of a single night of sleep restriction.  
NOTE Confidence: 0.8509262

00:21:56.730 --> 00:21:59.397 By restricting the athletes sleep by 33%,

NOTE Confidence: 0.8509262

00:21:59.400 --> 00:22:02.592 so down from about 7 1/2 hours of

NOTE Confidence: 0.8509262

00:22:02.592 --> 00:22:05.860 sleep to five hours for one night.

NOTE Confidence: 0.8509262

00:22:05.860 --> 00:22:08.188 In the second study they keep.

NOTE Confidence: 0.8509262

00:22:08.190 --> 00:22:10.518 They kept that same sleep manipulation,

NOTE Confidence: 0.8509262

00:22:10.520 --> 00:22:13.460 but they added in the possibility of

NOTE Confidence: 0.8509262

00:22:13.460 --> 00:22:15.736 receiving 80 milligrams of caffeine

NOTE Confidence: 0.8509262

00:22:15.736 --> 00:22:18.086 in that sleep restricted condition.

NOTE Confidence: 0.8509262

00:22:18.090 --> 00:22:19.482 And for both studies,

NOTE Confidence: 0.8509262

00:22:19.482 --> 00:22:21.222 the tennis players were tested.

NOTE Confidence: 0.8509262

00:22:21.230 --> 00:22:23.148 On their ability to place the serve

NOTE Confidence: 0.8509262

00:22:23.148 --> 00:22:24.802 in a very specifically marked

NOTE Confidence: 0.8509262

00:22:24.802 --> 00:22:26.717 area in the service box,

NOTE Confidence: 0.8509262

00:22:26.720 --> 00:22:29.576 so that's actually taken straight from

NOTE Confidence: 0.8509262

00:22:29.576 --> 00:22:31.970 their publication that graphic there.

NOTE Confidence: 0.8509262

00:22:31.970 --> 00:22:33.650 In the first study,

NOTE Confidence: 0.8509262

00:22:33.650 --> 00:22:36.170 they found that tennis serve accuracy  
NOTE Confidence: 0.8509262

00:22:36.247 --> 00:22:38.191 was impaired by approximately  
NOTE Confidence: 0.8509262

00:22:38.191 --> 00:22:41.050 30% under sleep restriction.  
NOTE Confidence: 0.8509262

00:22:41.050 --> 00:22:43.075 So a significant reduction in  
NOTE Confidence: 0.8509262

00:22:43.075 --> 00:22:45.100 performance from only a single  
NOTE Confidence: 0.8509262

00:22:45.168 --> 00:22:46.988 night of sleep restriction.  
NOTE Confidence: 0.8509262

00:22:46.990 --> 00:22:48.550 In the second study,  
NOTE Confidence: 0.8509262

00:22:48.550 --> 00:22:50.500 they found relatively similar results,  
NOTE Confidence: 0.8509262

00:22:50.500 --> 00:22:53.308 but what was most notable here is that  
NOTE Confidence: 0.8509262

00:22:53.308 --> 00:22:55.315 caffeine did not rescue performance  
NOTE Confidence: 0.8509262

00:22:55.315 --> 00:22:58.199 in the sleeper statistic in the sleep  
NOTE Confidence: 0.8509262

00:22:58.277 --> 00:23:00.237 restricted condition did not improve  
NOTE Confidence: 0.8509262

00:23:00.237 --> 00:23:03.158 it back up to normal baseline levels.  
NOTE Confidence: 0.8509262

00:23:03.158 --> 00:23:06.032 So this study provided some pretty  
NOTE Confidence: 0.8509262

00:23:06.032 --> 00:23:08.250 compelling evidence that a single night  
NOTE Confidence: 0.8509262

00:23:08.250 --> 00:23:10.512 of sleep loss may have a significant

NOTE Confidence: 0.8509262

00:23:10.512 --> 00:23:13.389 impact on fine motor skills that are

NOTE Confidence: 0.8509262

00:23:13.389 --> 00:23:14.980 relevant for athletic performance.

NOTE Confidence: 0.8707033

00:23:17.680 --> 00:23:20.116 Now where we see more consistently

NOTE Confidence: 0.8707033

00:23:20.116 --> 00:23:21.740 pronounced decrements in performance,

NOTE Confidence: 0.8707033

00:23:21.740 --> 00:23:24.547 this seems to be with more sustained

NOTE Confidence: 0.8707033

00:23:24.547 --> 00:23:27.068 or chronic sleep loss, but again,

NOTE Confidence: 0.8707033

00:23:27.068 --> 00:23:29.642 even here there's very little high

NOTE Confidence: 0.8707033

00:23:29.642 --> 00:23:31.479 quality research in this area,

NOTE Confidence: 0.8707033

00:23:31.480 --> 00:23:33.742 and these studies of quote unquote

NOTE Confidence: 0.8707033

00:23:33.742 --> 00:23:35.780 chronic sleep loss are still

NOTE Confidence: 0.8707033

00:23:35.780 --> 00:23:37.733 relatively short term, which.

NOTE Confidence: 0.8707033

00:23:37.733 --> 00:23:41.674 Doesn't mimic what may be occurring among

NOTE Confidence: 0.8707033

00:23:41.674 --> 00:23:45.757 athletes who are chronically sleep deprived.

NOTE Confidence: 0.8707033

00:23:45.760 --> 00:23:47.806 So I wanted to over the

NOTE Confidence: 0.8707033

00:23:47.806 --> 00:23:49.170 next couple of slides,

NOTE Confidence: 0.8707033



00:23:49.170 --> 00:23:51.466 just point out a couple of classic studies

NOTE Confidence: 0.8707033

00:23:51.466 --> 00:23:53.599 that have demonstrated these effects.

NOTE Confidence: 0.8707033

00:23:53.600 --> 00:23:56.328 So in this first study on this slide,

NOTE Confidence: 0.8707033

00:23:56.330 --> 00:23:58.640 this is a study by led by

NOTE Confidence: 0.8707033

00:23:58.640 --> 00:24:00.080 David Dangerous at Penn,

NOTE Confidence: 0.8707033

00:24:00.080 --> 00:24:02.174 and they had participants complete a

NOTE Confidence: 0.8707033

00:24:02.174 --> 00:24:04.170 10 minute sustained reaction time task.

NOTE Confidence: 0.8707033

00:24:04.170 --> 00:24:05.193 So the Pvt.

NOTE Confidence: 0.8707033

00:24:05.193 --> 00:24:06.898 At baseline after week of

NOTE Confidence: 0.8707033

00:24:06.898 --> 00:24:08.608 approximately 8 hours of sleep,

NOTE Confidence: 0.8707033

00:24:08.610 --> 00:24:10.656 and then they restricted these participants

NOTE Confidence: 0.8707033

00:24:10.656 --> 00:24:12.784 sleep by 33% to so approximately

NOTE Confidence: 0.8707033

00:24:12.784 --> 00:24:15.940 4 to 5 hours of sleep per night.

NOTE Confidence: 0.8707033

00:24:15.940 --> 00:24:18.054 And they had to maintain that sleep

NOTE Confidence: 0.8707033

00:24:18.054 --> 00:24:19.830 schedule for seven nights, again,

NOTE Confidence: 0.8707033

00:24:19.830 --> 00:24:21.930 measuring reaction time in each

NOTE Confidence: 0.8707033

00:24:21.930 --> 00:24:24.479 day over that seven day period.

NOTE Confidence: 0.8707033

00:24:24.480 --> 00:24:27.644 So what they found was a gradual

NOTE Confidence: 0.8707033

00:24:27.644 --> 00:24:30.290 increase in reaction time overtime.

NOTE Confidence: 0.8707033

00:24:30.290 --> 00:24:30.725 Again,

NOTE Confidence: 0.8707033

00:24:30.725 --> 00:24:32.900 a relatively minor increase after

NOTE Confidence: 0.8707033

00:24:32.900 --> 00:24:35.610 one night of sleep restriction,

NOTE Confidence: 0.8707033

00:24:35.610 --> 00:24:39.312 but a but more accumulated effect

NOTE Confidence: 0.8707033

00:24:39.312 --> 00:24:41.780 over those seven nights.

NOTE Confidence: 0.8707033

00:24:41.780 --> 00:24:44.335 In altogether seven nights of

NOTE Confidence: 0.8707033

00:24:44.335 --> 00:24:47.240 restricted sleep resulted in a 33%

NOTE Confidence: 0.8707033

00:24:47.240 --> 00:24:50.640 slowing of sustained reaction time.

NOTE Confidence: 0.8707033

00:24:50.640 --> 00:24:50.997 Now,

NOTE Confidence: 0.8707033

00:24:50.997 --> 00:24:53.139 what's interesting is that after those

NOTE Confidence: 0.8707033

00:24:53.139 --> 00:24:55.309 seven nights of restricted sleep,

NOTE Confidence: 0.8707033

00:24:55.310 --> 00:24:55.856 the.

NOTE Confidence: 0.8707033

00:24:55.856 --> 00:24:58.586 The protocol involved two nights  
NOTE Confidence: 0.8707033

00:24:58.586 --> 00:25:00.224 of recovery sleep,  
NOTE Confidence: 0.8707033

00:25:00.230 --> 00:25:03.975 so sleep of eight to 10 hours.  
NOTE Confidence: 0.8707033

00:25:03.980 --> 00:25:06.492 And it took two full nights of that  
NOTE Confidence: 0.8707033

00:25:06.492 --> 00:25:08.594 recovery sleep to recover from the  
NOTE Confidence: 0.8707033

00:25:08.594 --> 00:25:10.354 seven nights of restricted sleep  
NOTE Confidence: 0.8707033

00:25:10.354 --> 00:25:12.969 and subsequent studies have shown a  
NOTE Confidence: 0.8707033

00:25:12.969 --> 00:25:15.169 similar cumulative effect on different  
NOTE Confidence: 0.8707033

00:25:15.170 --> 00:25:17.618 aspects of cognitive performance.  
NOTE Confidence: 0.8707033

00:25:17.618 --> 00:25:20.066 And this obviously has.  
NOTE Confidence: 0.8707033

00:25:20.070 --> 00:25:21.936 Direct relevance to performance and training,  
NOTE Confidence: 0.8707033

00:25:21.940 --> 00:25:22.879 so even this,  
NOTE Confidence: 0.8707033

00:25:22.879 --> 00:25:24.757 even though this study was not  
NOTE Confidence: 0.8707033

00:25:24.757 --> 00:25:26.589 conducted specifically in athletes.  
NOTE Confidence: 0.8707033

00:25:26.590 --> 00:25:28.214 Reaction time decision making.  
NOTE Confidence: 0.8707033

00:25:28.214 --> 00:25:30.244 Those are all highly relevant,

NOTE Confidence: 0.8707033

00:25:30.250 --> 00:25:32.398 especially at the elite level when.

NOTE Confidence: 0.8707033

00:25:32.400 --> 00:25:34.820 Really, the physical physical ability.

NOTE Confidence: 0.8707033

00:25:34.820 --> 00:25:37.706 It's a relatively level playing field.

NOTE Confidence: 0.8707033

00:25:37.710 --> 00:25:39.638 What differentiates are these

NOTE Confidence: 0.8707033

00:25:39.638 --> 00:25:41.084 more cognitive factors?

NOTE Confidence: 0.8760177

00:25:43.340 --> 00:25:45.636 So shown here is another classic study,

NOTE Confidence: 0.8760177

00:25:45.640 --> 00:25:48.064 this time with the focus of looking at

NOTE Confidence: 0.8760177

00:25:48.064 --> 00:25:50.249 chronic sleep loss in muscular strength.

NOTE Confidence: 0.8760177

00:25:50.250 --> 00:25:52.386 So in this study, participants experienced

NOTE Confidence: 0.8760177

00:25:52.386 --> 00:25:54.760 three nights of sleep that was reduced

NOTE Confidence: 0.8760177

00:25:54.760 --> 00:25:56.825 from eight to three hours per night,

NOTE Confidence: 0.8760177

00:25:56.830 --> 00:25:59.530 and this is contrasted against a

NOTE Confidence: 0.8760177

00:25:59.530 --> 00:26:02.189 control condition that was allowed to

NOTE Confidence: 0.8760177

00:26:02.189 --> 00:26:04.919 sleep 8 hours each of those nights.

NOTE Confidence: 0.8760177

00:26:04.920 --> 00:26:06.728 So in this study,

NOTE Confidence: 0.8760177

00:26:06.728 --> 00:26:08.988 participants performed variety of lifts,  
NOTE Confidence: 0.8760177

00:26:08.990 --> 00:26:10.382 muscular strength lifts,  
NOTE Confidence: 0.8760177

00:26:10.382 --> 00:26:14.126 but I've only shown the leg press here  
NOTE Confidence: 0.8760177

00:26:14.126 --> 00:26:17.390 so you can see that relative to baseline  
NOTE Confidence: 0.8760177

00:26:17.390 --> 00:26:20.286 after one night of restricted sleep,  
NOTE Confidence: 0.8760177

00:26:20.290 --> 00:26:23.447 there wasn't too much of a difference,  
NOTE Confidence: 0.8760177

00:26:23.450 --> 00:26:25.665 but the effects became increasingly  
NOTE Confidence: 0.8760177

00:26:25.665 --> 00:26:28.879 apparent on the second and third nights,  
NOTE Confidence: 0.8760177

00:26:28.880 --> 00:26:31.200 eventually resulting in 19% lower  
NOTE Confidence: 0.8760177

00:26:31.200 --> 00:26:34.070 strength output in the leg press.  
NOTE Confidence: 0.8760177

00:26:34.070 --> 00:26:36.620 In the Sleep Restriction Group after  
NOTE Confidence: 0.8760177

00:26:36.620 --> 00:26:38.744 after three nights now, surprisingly,  
NOTE Confidence: 0.8760177

00:26:38.744 --> 00:26:41.712 there's still very few of these studies  
NOTE Confidence: 0.8760177

00:26:41.712 --> 00:26:43.463 examining athletic performance markers  
NOTE Confidence: 0.8760177

00:26:43.463 --> 00:26:46.396 over these subchronic periods of sleep loss.  
NOTE Confidence: 0.8760177

00:26:46.400 --> 00:26:49.088 So we're currently in the planning

NOTE Confidence: 0.8760177

00:26:49.088 --> 00:26:51.919 stages for one of the zip it.

NOTE Confidence: 0.8760177

00:26:51.920 --> 00:26:53.282 There was,

NOTE Confidence: 0.8760177

00:26:53.282 --> 00:26:56.687 unfortunately interrupted by by Covid.

NOTE Confidence: 0.8760177

00:26:56.690 --> 00:26:58.706 So what about training in recovery?

NOTE Confidence: 0.8760177

00:26:58.710 --> 00:27:00.395 So obviously optimizing training and

NOTE Confidence: 0.8760177

00:27:00.395 --> 00:27:02.080 recovery is essential for performance,

NOTE Confidence: 0.8760177

00:27:02.080 --> 00:27:03.432 and if you're injured,

NOTE Confidence: 0.8760177

00:27:03.432 --> 00:27:03.770 sick,

NOTE Confidence: 0.8760177

00:27:03.770 --> 00:27:05.786 or just simply unable to recover,

NOTE Confidence: 0.8760177

00:27:05.790 --> 00:27:07.764 you're not going to be able to

NOTE Confidence: 0.8760177

00:27:07.764 --> 00:27:09.875 put in the training that allows

NOTE Confidence: 0.8760177

00:27:09.875 --> 00:27:11.855 you to perform your best.

NOTE Confidence: 0.8388168

00:27:14.370 --> 00:27:16.827 So I wanted to start off this section by

NOTE Confidence: 0.8388168

00:27:16.827 --> 00:27:18.845 really pointing out and emphasizing how

NOTE Confidence: 0.8388168

00:27:18.845 --> 00:27:20.995 sleep is critical for the acquisition

NOTE Confidence: 0.8388168

00:27:20.995 --> 00:27:23.025 and retention of motor skills.  
NOTE Confidence: 0.8388168

00:27:23.030 --> 00:27:24.695 And remember it's during sleep  
NOTE Confidence: 0.8388168

00:27:24.695 --> 00:27:26.027 that we consolidate memories.  
NOTE Confidence: 0.8388168

00:27:26.030 --> 00:27:28.016 We prune synapses that aren't critical,  
NOTE Confidence: 0.8388168

00:27:28.020 --> 00:27:29.690 strengthen those that are important,  
NOTE Confidence: 0.8388168

00:27:29.690 --> 00:27:32.082 and I always go back to this classic  
NOTE Confidence: 0.8388168

00:27:32.082 --> 00:27:34.188 study by Matt Walker and colleagues  
NOTE Confidence: 0.8388168

00:27:34.188 --> 00:27:36.680 when he was in Bob Stickels lab.  
NOTE Confidence: 0.8388168

00:27:36.680 --> 00:27:39.677 So this is going back nearly 20 years now.  
NOTE Confidence: 0.8388168

00:27:39.680 --> 00:27:41.864 But in this study they showed  
NOTE Confidence: 0.8388168

00:27:41.864 --> 00:27:43.840 that learning a new skill.  
NOTE Confidence: 0.8388168

00:27:43.840 --> 00:27:45.488 Is improved with sleep,  
NOTE Confidence: 0.8388168

00:27:45.488 --> 00:27:49.193 so on the far left that graph shows  
NOTE Confidence: 0.8388168

00:27:49.193 --> 00:27:52.043 that participants first learned a  
NOTE Confidence: 0.8388168

00:27:52.043 --> 00:27:54.900 finger tapping task at 10:00 AM.  
NOTE Confidence: 0.8388168

00:27:54.900 --> 00:27:57.700 And when they tested them 12 hours later,

NOTE Confidence: 0.8388168  
00:27:57.700 --> 00:27:58.288 no improvement.  
NOTE Confidence: 0.8388168  
00:27:58.288 --> 00:27:59.758 Then they allowed them to  
NOTE Confidence: 0.8388168  
00:27:59.758 --> 00:28:01.166 sleep and suddenly performance  
NOTE Confidence: 0.8388168  
00:28:01.166 --> 00:28:02.597 was significantly improved.  
NOTE Confidence: 0.8388168  
00:28:02.600 --> 00:28:05.240 But this could be due to a delayed  
NOTE Confidence: 0.8388168  
00:28:05.240 --> 00:28:07.850 effect or just the passage of time.  
NOTE Confidence: 0.8388168  
00:28:07.850 --> 00:28:11.746 So in a separate group of participants they.  
NOTE Confidence: 0.8388168  
00:28:11.750 --> 00:28:14.198 Initially taught that same skill at 10:00 PM,  
NOTE Confidence: 0.8388168  
00:28:14.200 --> 00:28:17.070 then test it again 12 hours later.  
NOTE Confidence: 0.8388168  
00:28:17.070 --> 00:28:19.436 After a night of sleep and again  
NOTE Confidence: 0.8388168  
00:28:19.436 --> 00:28:21.239 just confirmed that sleep seemed  
NOTE Confidence: 0.8388168  
00:28:21.239 --> 00:28:23.049 to be the critical factor.  
NOTE Confidence: 0.8388168  
00:28:23.050 --> 00:28:25.507 Now the role of sleep in motor  
NOTE Confidence: 0.8388168  
00:28:25.507 --> 00:28:27.668 skill acquisition is been shown to  
NOTE Confidence: 0.8388168  
00:28:27.668 --> 00:28:29.732 be much more complex than this,  
NOTE Confidence: 0.8388168



00:28:29.740 --> 00:28:32.155 but it really to me highlights the  
NOTE Confidence: 0.8388168

00:28:32.155 --> 00:28:33.580 potentially important role for  
NOTE Confidence: 0.8388168

00:28:33.580 --> 00:28:35.578 sleep in learning skills that are  
NOTE Confidence: 0.8388168

00:28:35.578 --> 00:28:37.489 rehearsed in athletic team practices.  
NOTE Confidence: 0.8388168

00:28:37.490 --> 00:28:40.087 And while a number of studies have  
NOTE Confidence: 0.8388168

00:28:40.087 --> 00:28:42.985 now linked sleep to both fine and  
NOTE Confidence: 0.8388168

00:28:42.985 --> 00:28:44.693 gross motor skill acquisition.  
NOTE Confidence: 0.8388168

00:28:44.700 --> 00:28:45.918 To my knowledge,  
NOTE Confidence: 0.8388168

00:28:45.918 --> 00:28:48.354 no studies really looked at the  
NOTE Confidence: 0.8388168

00:28:48.354 --> 00:28:50.379 acquisition of specific sports skills  
NOTE Confidence: 0.8388168

00:28:50.379 --> 00:28:53.580 and how sleep may influence its acquisition.  
NOTE Confidence: 0.83999413

00:28:55.930 --> 00:28:58.527 Now, while athletes may debate which recovery  
NOTE Confidence: 0.83999413

00:28:58.527 --> 00:29:00.609 strategies are most most beneficial,  
NOTE Confidence: 0.83999413

00:29:00.610 --> 00:29:03.658 sleep is often considered to be the best  
NOTE Confidence: 0.83999413

00:29:03.658 --> 00:29:06.067 recovery strategy available to an athlete,  
NOTE Confidence: 0.83999413

00:29:06.070 --> 00:29:08.000 and the schematic on the

NOTE Confidence: 0.83999413

00:29:08.000 --> 00:29:10.360 left really to meet a pix,

NOTE Confidence: 0.83999413

00:29:10.360 --> 00:29:12.747 depicts well how training is designed to

NOTE Confidence: 0.83999413

00:29:12.747 --> 00:29:15.817 lead to a transient dip in performance,

NOTE Confidence: 0.83999413

00:29:15.820 --> 00:29:17.595 but with proper recovery will

NOTE Confidence: 0.83999413

00:29:17.595 --> 00:29:20.697 lead to a new and greater baseline

NOTE Confidence: 0.83999413

00:29:20.697 --> 00:29:22.560 of performance overtime.

NOTE Confidence: 0.83999413

00:29:22.560 --> 00:29:24.472 But with insufficient recovery,

NOTE Confidence: 0.83999413

00:29:24.472 --> 00:29:27.340 that new baseline is not reached,

NOTE Confidence: 0.83999413

00:29:27.340 --> 00:29:28.729 and in contrast,

NOTE Confidence: 0.83999413

00:29:28.729 --> 00:29:30.581 performance continues to deteriorate

NOTE Confidence: 0.83999413

00:29:30.581 --> 00:29:32.600 with with subsequent training.

NOTE Confidence: 0.81555533

00:29:34.650 --> 00:29:37.140 Sergio two fixed group in Brazil,

NOTE Confidence: 0.81555533

00:29:37.140 --> 00:29:39.220 published nearly ten years ago.

NOTE Confidence: 0.81555533

00:29:39.220 --> 00:29:41.275 Now a theoretical review that

NOTE Confidence: 0.81555533

00:29:41.275 --> 00:29:43.330 described how restricted sleep could

NOTE Confidence: 0.81555533

00:29:43.401 --> 00:29:45.867 impair or could impact the muscle  
NOTE Confidence: 0.81555533

00:29:45.867 --> 00:29:47.511 repair and regeneration process,  
NOTE Confidence: 0.81555533

00:29:47.520 --> 00:29:49.588 basically converting sleep from  
NOTE Confidence: 0.81555533

00:29:49.588 --> 00:29:51.656 a relatively anabolic state.  
NOTE Confidence: 0.81555533

00:29:51.660 --> 00:29:54.060 Into more of a catabolic state.  
NOTE Confidence: 0.81555533

00:29:54.060 --> 00:29:56.220 But just like for athletic performance,  
NOTE Confidence: 0.81555533

00:29:56.220 --> 00:29:58.434 we we still have relatively little  
NOTE Confidence: 0.81555533

00:29:58.434 --> 00:30:00.250 research that's directly examine them.  
NOTE Confidence: 0.81555533

00:30:00.250 --> 00:30:04.866 Words of sleep for the recovery of athletes.  
NOTE Confidence: 0.81555533

00:30:04.870 --> 00:30:07.534 Now we do know that acute bouts of  
NOTE Confidence: 0.81555533

00:30:07.534 --> 00:30:09.900 training not even considering sleep.  
NOTE Confidence: 0.81555533

00:30:09.900 --> 00:30:12.066 Acute bouts of training lead to  
NOTE Confidence: 0.81555533

00:30:12.066 --> 00:30:14.160 transient dips in immune function.  
NOTE Confidence: 0.81555533

00:30:14.160 --> 00:30:16.824 And we also know from the non athlete  
NOTE Confidence: 0.81555533

00:30:16.824 --> 00:30:19.190 literature that there's increased illness.  
NOTE Confidence: 0.81555533

00:30:19.190 --> 00:30:21.120 Risk risk with restricted sleep.

NOTE Confidence: 0.81555533

00:30:21.120 --> 00:30:24.136 So this infographic is from a study that

NOTE Confidence: 0.81555533

00:30:24.136 --> 00:30:26.363 was conducted at Carnegie Mellon about

NOTE Confidence: 0.81555533

00:30:26.363 --> 00:30:29.372 five years ago now and in this study

NOTE Confidence: 0.81555533

00:30:29.372 --> 00:30:31.886 they inoculated a sample of participants

NOTE Confidence: 0.81555533

00:30:31.886 --> 00:30:35.210 with the rhinovirus or the common cold.

NOTE Confidence: 0.81555533

00:30:35.210 --> 00:30:37.562 And then they looked at how participants

NOTE Confidence: 0.81555533

00:30:37.562 --> 00:30:40.097 slept in the two weeks leading up

NOTE Confidence: 0.81555533

00:30:40.097 --> 00:30:41.927 to exposure to that rhinovirus.

NOTE Confidence: 0.81555533

00:30:41.930 --> 00:30:45.302 And they found a relatively dose

NOTE Confidence: 0.81555533

00:30:45.302 --> 00:30:48.103 dependent likelihood of catching a

NOTE Confidence: 0.81555533

00:30:48.103 --> 00:30:50.845 cold based upon your sleep history.

NOTE Confidence: 0.81555533

00:30:50.850 --> 00:30:53.160 So.

NOTE Confidence: 0.81555533

00:30:53.160 --> 00:30:54.993 This really provided.

NOTE Confidence: 0.81555533

00:30:54.993 --> 00:30:58.659 Pretty strong evidence that sleep will

NOTE Confidence: 0.81555533

00:30:58.659 --> 00:31:01.325 adequately protect you against catching

NOTE Confidence: 0.81555533

00:31:01.325 --> 00:31:04.960 the cold in a dose dependent manner.  
NOTE Confidence: 0.81555533

00:31:04.960 --> 00:31:06.985 An obviously this wasn't conducted  
NOTE Confidence: 0.81555533

00:31:06.985 --> 00:31:09.252 in athletes, but this to me.  
NOTE Confidence: 0.81555533

00:31:09.252 --> 00:31:11.067 Also emphasizes the importance of  
NOTE Confidence: 0.81555533

00:31:11.067 --> 00:31:13.489 sleep at protecting immune function.  
NOTE Confidence: 0.81555533

00:31:13.490 --> 00:31:15.520 Athletes cannot train in an  
NOTE Confidence: 0.81555533

00:31:15.520 --> 00:31:17.550 optimal manner if they're sick.  
NOTE Confidence: 0.8519095

00:31:19.930 --> 00:31:22.156 We also know that inadequate sleep  
NOTE Confidence: 0.8519095

00:31:22.156 --> 00:31:24.768 leads to an increased risk for injury,  
NOTE Confidence: 0.8519095

00:31:24.770 --> 00:31:27.346 so this study, shown here on this slide  
NOTE Confidence: 0.8519095

00:31:27.346 --> 00:31:30.500 is the first of several studies that have  
NOTE Confidence: 0.8519095

00:31:30.500 --> 00:31:33.318 been published on sleep and injury risk,  
NOTE Confidence: 0.8519095

00:31:33.320 --> 00:31:35.805 and ironically, for some reason they are  
NOTE Confidence: 0.8519095

00:31:35.805 --> 00:31:37.790 seemingly all focused on adolescents.  
NOTE Confidence: 0.8519095

00:31:37.790 --> 00:31:39.250 But in this survey,  
NOTE Confidence: 0.8519095

00:31:39.250 --> 00:31:41.075 high school athletes in California

NOTE Confidence: 0.8519095

00:31:41.075 --> 00:31:42.991 completed a survey about training

NOTE Confidence: 0.8519095

00:31:42.991 --> 00:31:44.475 habits and health behaviors,

NOTE Confidence: 0.8519095

00:31:44.480 --> 00:31:46.600 and then these factors were

NOTE Confidence: 0.8519095

00:31:46.600 --> 00:31:48.296 evaluated against objective injury

NOTE Confidence: 0.8519095

00:31:48.296 --> 00:31:50.116 records that were kept by the.

NOTE Confidence: 0.8519095

00:31:50.120 --> 00:31:54.030 Various high school athletic department's.

NOTE Confidence: 0.8519095

00:31:54.030 --> 00:31:57.430 And you can see here that the injury

NOTE Confidence: 0.8519095

00:31:57.430 --> 00:32:00.808 rate differs across different amounts of.

NOTE Confidence: 0.8519095

00:32:00.810 --> 00:32:02.610 Typical sleep duration that

NOTE Confidence: 0.8519095

00:32:02.610 --> 00:32:04.410 reported by these athletes,

NOTE Confidence: 0.8519095

00:32:04.410 --> 00:32:06.210 but altogether getting less

NOTE Confidence: 0.8519095

00:32:06.210 --> 00:32:08.460 than 8 hours of sleep.

NOTE Confidence: 0.8519095

00:32:08.460 --> 00:32:10.530 Those athletes had 70% greater

NOTE Confidence: 0.8519095

00:32:10.530 --> 00:32:12.186 odds of experiencing injury

NOTE Confidence: 0.8519095

00:32:12.186 --> 00:32:14.309 in that competitive season.

NOTE Confidence: 0.8150859

00:32:17.190 --> 00:32:18.480 Finally, minimal evidence,  
NOTE Confidence: 0.8150859

00:32:18.480 --> 00:32:21.927 but what evidence is there does seem to  
NOTE Confidence: 0.8150859

00:32:21.927 --> 00:32:24.461 does seem to suggest that athletes just  
NOTE Confidence: 0.8150859

00:32:24.461 --> 00:32:27.272 don't seem to bounce back as quickly  
NOTE Confidence: 0.8150859

00:32:27.272 --> 00:32:29.287 when they aren't sleeping enough.  
NOTE Confidence: 0.8150859

00:32:29.290 --> 00:32:32.671 So the study involved a within subjects  
NOTE Confidence: 0.8150859

00:32:32.671 --> 00:32:35.525 design in which they assessed peak  
NOTE Confidence: 0.8150859

00:32:35.525 --> 00:32:38.598 power on a bike or grammar test  
NOTE Confidence: 0.8150859

00:32:38.687 --> 00:32:41.232 prior to high intensity training  
NOTE Confidence: 0.8150859

00:32:41.232 --> 00:32:44.426 session and then 24 hours after.  
NOTE Confidence: 0.8150859

00:32:44.426 --> 00:32:47.656 That high intensity training session.  
NOTE Confidence: 0.8150859

00:32:47.660 --> 00:32:50.320 So assessed twice 24 hours apart and  
NOTE Confidence: 0.8150859

00:32:50.320 --> 00:32:52.690 in between those two assessments,  
NOTE Confidence: 0.8150859

00:32:52.690 --> 00:32:55.230 participants were either allowed to  
NOTE Confidence: 0.8150859

00:32:55.230 --> 00:32:58.214 maintain their normal sleep patterns or  
NOTE Confidence: 0.8150859

00:32:58.214 --> 00:33:00.804 they were told to restrict their sleep.

NOTE Confidence: 0.8150859

00:33:00.810 --> 00:33:04.203 By 50% and you can see here on the

NOTE Confidence: 0.8150859

00:33:04.203 --> 00:33:07.579 left under normal sleep conditions,

NOTE Confidence: 0.8150859

00:33:07.580 --> 00:33:10.328 the athletes were actually able to

NOTE Confidence: 0.8150859

00:33:10.328 --> 00:33:12.671 bounce back almost completely from

NOTE Confidence: 0.8150859

00:33:12.671 --> 00:33:14.851 that high intensity training session

NOTE Confidence: 0.8150859

00:33:14.851 --> 00:33:17.934 and have nearly the same peak power

NOTE Confidence: 0.8150859

00:33:17.934 --> 00:33:20.034 generation 24 hours after that.

NOTE Confidence: 0.8150859

00:33:20.040 --> 00:33:22.392 After that training session,

NOTE Confidence: 0.8150859

00:33:22.392 --> 00:33:24.744 whereas under restricted sleep.

NOTE Confidence: 0.8150859

00:33:24.750 --> 00:33:30.720 They only were able to recover by 95% so.

NOTE Confidence: 0.8150859

00:33:30.720 --> 00:33:32.880 This may seem trivial,

NOTE Confidence: 0.8150859

00:33:32.880 --> 00:33:36.660 only a 4% difference in the magnitude

NOTE Confidence: 0.8150859

00:33:36.660 --> 00:33:37.740 of recovery,

NOTE Confidence: 0.8150859

00:33:37.740 --> 00:33:40.660 but many practitioners emphasize that

NOTE Confidence: 0.8150859

00:33:40.660 --> 00:33:43.580 it's exactly these small incremental

NOTE Confidence: 0.8150859



00:33:43.667 --> 00:33:46.392 differences on an individual daily  
NOTE Confidence: 0.8150859

00:33:46.392 --> 00:33:49.673 basis that can accumulate overtime and  
NOTE Confidence: 0.8150859

00:33:49.673 --> 00:33:52.517 lead to significant reductions in the  
NOTE Confidence: 0.8150859

00:33:52.517 --> 00:33:55.560 ability to recover and repair bodies.  
NOTE Confidence: 0.88030875

00:33:58.600 --> 00:34:01.363 So just a few slides here on what we  
NOTE Confidence: 0.88030875

00:34:01.363 --> 00:34:04.483 know about sleep interventions and how  
NOTE Confidence: 0.88030875

00:34:04.483 --> 00:34:07.218 they could impact athletic performance.  
NOTE Confidence: 0.88030875

00:34:07.220 --> 00:34:10.320 So around 10 years ago.  
NOTE Confidence: 0.88030875

00:34:10.320 --> 00:34:13.496 I mean only a few professional teams really  
NOTE Confidence: 0.88030875

00:34:13.496 --> 00:34:16.029 consulted with sleep experts and that  
NOTE Confidence: 0.88030875

00:34:16.029 --> 00:34:18.531 was they were considered cutting edge.  
NOTE Confidence: 0.88030875

00:34:18.540 --> 00:34:20.544 Now among collegiate and  
NOTE Confidence: 0.88030875

00:34:20.544 --> 00:34:22.047 professional athletic teams.  
NOTE Confidence: 0.88030875

00:34:22.050 --> 00:34:24.660 They're considered lagging if they're not  
NOTE Confidence: 0.88030875

00:34:24.660 --> 00:34:27.170 consulting with with sleep experts in.  
NOTE Confidence: 0.88030875

00:34:27.170 --> 00:34:28.678 Several. Commercial companies now

NOTE Confidence: 0.88030875

00:34:28.678 --> 00:34:30.940 exist solely for the purpose of

NOTE Confidence: 0.88030875

00:34:30.999 --> 00:34:33.029 sleep consulting to athletic teams.

NOTE Confidence: 0.8769063

00:34:35.170 --> 00:34:38.874 So the study that really seemed to jumpstart.

NOTE Confidence: 0.8769063

00:34:38.880 --> 00:34:40.850 Our appreciation on the potential

NOTE Confidence: 0.8769063

00:34:40.850 --> 00:34:42.820 of sleep to optimize performance

NOTE Confidence: 0.8769063

00:34:42.887 --> 00:34:44.855 came from this study from Sherry,

NOTE Confidence: 0.8769063

00:34:44.860 --> 00:34:47.710 MA and colleagues at Stanford.

NOTE Confidence: 0.8769063

00:34:47.710 --> 00:34:50.638 The study involved a sample of

NOTE Confidence: 0.8769063

00:34:50.638 --> 00:34:53.232 Stanford basketball players and the

NOTE Confidence: 0.8769063

00:34:53.232 --> 00:34:55.468 intervention was basically encouraging

NOTE Confidence: 0.8769063

00:34:55.468 --> 00:34:58.690 the athletes to extend their sleep

NOTE Confidence: 0.8769063

00:34:58.690 --> 00:35:01.458 with the goal of achieving up to 10

NOTE Confidence: 0.8769063

00:35:01.458 --> 00:35:04.630 or more hours of sleep per night.

NOTE Confidence: 0.8769063

00:35:04.630 --> 00:35:06.510 Optimally focused on obtaining

NOTE Confidence: 0.8769063

00:35:06.510 --> 00:35:07.920 sufficient nighttime sleep,

NOTE Confidence: 0.8769063

00:35:07.920 --> 00:35:10.270 but when that wasn't possible,  
NOTE Confidence: 0.8769063

00:35:10.270 --> 00:35:12.620 daytime napping was was encouraged.  
NOTE Confidence: 0.8769063

00:35:12.620 --> 00:35:15.182 So overall, over the five to  
NOTE Confidence: 0.8769063

00:35:15.182 --> 00:35:17.860 seven weeks of sleep extension.  
NOTE Confidence: 0.8769063

00:35:17.860 --> 00:35:21.163 They didn't quite get to the 10 hour goal,  
NOTE Confidence: 0.8769063

00:35:21.170 --> 00:35:24.565 but these athletes on average did increase  
NOTE Confidence: 0.8769063

00:35:24.565 --> 00:35:27.976 their sick duration by 1.8 hours on average.  
NOTE Confidence: 0.8769063

00:35:27.980 --> 00:35:30.224 And with what Mon colleagues found  
NOTE Confidence: 0.8769063

00:35:30.224 --> 00:35:32.721 was pretty much across the board  
NOTE Confidence: 0.8769063

00:35:32.721 --> 00:35:34.585 improvements in performance compared  
NOTE Confidence: 0.8769063

00:35:34.585 --> 00:35:36.945 to after sleep extension compared  
NOTE Confidence: 0.8769063

00:35:36.945 --> 00:35:39.080 to prior compared to baseline.  
NOTE Confidence: 0.8769063

00:35:39.080 --> 00:35:42.650 So a 4% improvement in Sprint times.  
NOTE Confidence: 0.8769063

00:35:42.650 --> 00:35:45.410 A 12% improvement in mean  
NOTE Confidence: 0.8769063

00:35:45.410 --> 00:35:47.618 reaction time and then.  
NOTE Confidence: 0.8769063

00:35:47.620 --> 00:35:48.512 Really significant

NOTE Confidence: 0.8769063

00:35:48.512 --> 00:35:49.850 improvements in basketball.

NOTE Confidence: 0.8769063

00:35:49.850 --> 00:35:51.834 Specific parameters of related

NOTE Confidence: 0.8769063

00:35:51.834 --> 00:35:54.810 to performance and then also just

NOTE Confidence: 0.8769063

00:35:54.894 --> 00:35:57.609 general mood in daytime sleepiness.

NOTE Confidence: 0.8769063

00:35:57.610 --> 00:35:59.182 So this study really.

NOTE Confidence: 0.8769063

00:35:59.182 --> 00:36:01.147 Remains the strongest evidence of

NOTE Confidence: 0.8769063

00:36:01.147 --> 00:36:03.480 the potential impact that increasing

NOTE Confidence: 0.8769063

00:36:03.480 --> 00:36:05.815 sleep duration or improving sleep

NOTE Confidence: 0.8769063

00:36:05.815 --> 00:36:08.349 can have on improving performance,

NOTE Confidence: 0.8769063

00:36:08.350 --> 00:36:11.878 and is rightly considered a very

NOTE Confidence: 0.8769063

00:36:11.878 --> 00:36:14.980 impactful paper on the field.

NOTE Confidence: 0.8769063

00:36:14.980 --> 00:36:18.102 But the rigor for this study was

NOTE Confidence: 0.8769063

00:36:18.102 --> 00:36:21.407 relatively low in terms of sample size.

NOTE Confidence: 0.8769063

00:36:21.410 --> 00:36:25.310 More importantly, no control condition.

NOTE Confidence: 0.8769063

00:36:25.310 --> 00:36:28.388 In terms of the more specific

NOTE Confidence: 0.8769063

00:36:28.388 --> 00:36:29.927 athletic performance parameters.  
NOTE Confidence: 0.8769063

00:36:29.930 --> 00:36:31.610 Shooting Sprint times free  
NOTE Confidence: 0.8769063

00:36:31.610 --> 00:36:32.870 through actual accuracy.  
NOTE Confidence: 0.8769063

00:36:32.870 --> 00:36:35.858 Those would be expected somewhat to  
NOTE Confidence: 0.8769063

00:36:35.858 --> 00:36:38.948 improve over the course of a season.  
NOTE Confidence: 0.8769063

00:36:38.950 --> 00:36:40.024 Now the mood.  
NOTE Confidence: 0.8769063

00:36:40.024 --> 00:36:41.456 Daytime sleepiness would definitely  
NOTE Confidence: 0.8769063

00:36:41.456 --> 00:36:43.199 not be expected to improve.  
NOTE Confidence: 0.85827154

00:36:45.440 --> 00:36:47.435 The intervention was relatively loose  
NOTE Confidence: 0.85827154

00:36:47.435 --> 00:36:50.170 without a lot of structured guidelines,  
NOTE Confidence: 0.85827154

00:36:50.170 --> 00:36:52.320 so from a practical standpoint,  
NOTE Confidence: 0.85827154

00:36:52.320 --> 00:36:54.290 this study really demonstrated the  
NOTE Confidence: 0.85827154

00:36:54.290 --> 00:36:57.050 potential for sleep to improve performance,  
NOTE Confidence: 0.85827154

00:36:57.050 --> 00:36:59.200 but from a scientific standpoint,  
NOTE Confidence: 0.85827154

00:36:59.200 --> 00:37:02.640 it still left a lot of questions unanswered.  
NOTE Confidence: 0.8553157

00:37:05.760 --> 00:37:07.865 Another study that really strongly

NOTE Confidence: 0.8553157

00:37:07.865 --> 00:37:10.516 demonstrated the impact of sleep extension

NOTE Confidence: 0.8553157

00:37:10.516 --> 00:37:12.931 on performance involved 12 collegiate

NOTE Confidence: 0.8553157

00:37:12.931 --> 00:37:15.279 varsity tennis tennis players and

NOTE Confidence: 0.8553157

00:37:15.279 --> 00:37:17.349 they monitored these athletes for one

NOTE Confidence: 0.8553157

00:37:17.349 --> 00:37:20.286 week in which they just maintain their

NOTE Confidence: 0.8553157

00:37:20.286 --> 00:37:23.130 habitual normal sleep habits and that

NOTE Confidence: 0.8553157

00:37:23.212 --> 00:37:26.396 was followed by a week in which these

NOTE Confidence: 0.8553157

00:37:26.396 --> 00:37:29.144 tennis players were asked to obtain at

NOTE Confidence: 0.8553157

00:37:29.144 --> 00:37:33.250 least nine hours of sleep per night.

NOTE Confidence: 0.8553157

00:37:33.250 --> 00:37:35.616 Now the main outcome here was tennis

NOTE Confidence: 0.8553157

00:37:35.616 --> 00:37:37.668 serve accuracy similar to that previous

NOTE Confidence: 0.8553157

00:37:37.668 --> 00:37:39.618 study that I already talked about,

NOTE Confidence: 0.8553157

00:37:39.620 --> 00:37:42.294 in which participants needed to place the

NOTE Confidence: 0.8553157

00:37:42.294 --> 00:37:44.873 server into a specific location in the

NOTE Confidence: 0.8553157

00:37:44.873 --> 00:37:48.380 service box for it to be considered accurate.

NOTE Confidence: 0.8553157

00:37:48.380 --> 00:37:51.446 So what they found was a significant  
NOTE Confidence: 0.8553157

00:37:51.446 --> 00:37:53.979 improvement in tennis serve accuracy.  
NOTE Confidence: 0.8553157

00:37:53.980 --> 00:37:56.955 After just one week of sleep extension  
NOTE Confidence: 0.8553157

00:37:56.955 --> 00:38:00.058 and alongside the improvements in tennis,  
NOTE Confidence: 0.8553157

00:38:00.060 --> 00:38:02.368 serve accuracy were significant  
NOTE Confidence: 0.8553157

00:38:02.368 --> 00:38:05.253 reductions in self reported sleepiness  
NOTE Confidence: 0.8553157

00:38:05.253 --> 00:38:08.756 so as depicted by the Epworth Sleepiness  
NOTE Confidence: 0.8553157

00:38:08.756 --> 00:38:12.080 Scale and the Stanford Sleepiness Scale.  
NOTE Confidence: 0.8553157

00:38:12.080 --> 00:38:13.296 So as I noted,  
NOTE Confidence: 0.8553157

00:38:13.296 --> 00:38:15.120 you know those two studies over  
NOTE Confidence: 0.8553157

00:38:15.188 --> 00:38:17.564 the last couple slides really have  
NOTE Confidence: 0.8553157

00:38:17.564 --> 00:38:19.750 provided the most notable support.  
NOTE Confidence: 0.8553157

00:38:19.750 --> 00:38:22.150 For the value of improving  
NOTE Confidence: 0.8553157

00:38:22.150 --> 00:38:24.070 sleep to improve performance.  
NOTE Confidence: 0.8553157

00:38:24.070 --> 00:38:25.165 Now more recently,  
NOTE Confidence: 0.8553157

00:38:25.165 --> 00:38:27.720 the concept of banking sleep prior to

NOTE Confidence: 0.8553157

00:38:27.787 --> 00:38:30.055 anticipated sleep loss has started to

NOTE Confidence: 0.8553157

00:38:30.055 --> 00:38:33.069 begun to be examined for its effectiveness.

NOTE Confidence: 0.8553157

00:38:33.070 --> 00:38:34.470 Most of these studies have

NOTE Confidence: 0.8553157

00:38:34.470 --> 00:38:35.590 focused on cognitive outcomes,

NOTE Confidence: 0.8553157

00:38:35.590 --> 00:38:37.786 so shown here is a study with the closest

NOTE Confidence: 0.8553157

00:38:37.786 --> 00:38:39.230 relevance to athletic performance.

NOTE Confidence: 0.8590667

00:38:41.700 --> 00:38:44.052 This was a randomized study in which

NOTE Confidence: 0.8590667

00:38:44.052 --> 00:38:45.858 randomized crossover study in which

NOTE Confidence: 0.8590667

00:38:45.858 --> 00:38:47.698 participants went through two different

NOTE Confidence: 0.8590667

00:38:47.698 --> 00:38:49.720 conditions that were six nights long.

NOTE Confidence: 0.8590667

00:38:49.720 --> 00:38:52.576 Prior to a night of total sleep deprivation,

NOTE Confidence: 0.8590667

00:38:52.580 --> 00:38:54.224 so in one condition,

NOTE Confidence: 0.8590667

00:38:54.224 --> 00:38:56.279 participants maintain their normal sleep

NOTE Confidence: 0.8590667

00:38:56.279 --> 00:38:58.999 habits around 8 hours in bed for six nights,

NOTE Confidence: 0.8590667

00:38:59.000 --> 00:39:01.608 and in the other they increase their time

NOTE Confidence: 0.8590667



00:39:01.608 --> 00:39:04.707 in bed by approximately 2 hours per night.

NOTE Confidence: 0.8590667

00:39:04.710 --> 00:39:05.970 Over those six nights.

NOTE Confidence: 0.8590667

00:39:05.970 --> 00:39:09.000 And after both of those six night conditions,

NOTE Confidence: 0.8590667

00:39:09.000 --> 00:39:11.170 they were tested before and

NOTE Confidence: 0.8590667

00:39:11.170 --> 00:39:13.340 after staying up all night.

NOTE Confidence: 0.8590667

00:39:13.340 --> 00:39:16.924 With the primary outcome being how long these

NOTE Confidence: 0.8590667

00:39:16.924 --> 00:39:19.606 individuals could sustain a submaximal knee

NOTE Confidence: 0.8590667

00:39:19.606 --> 00:39:22.666 extension at 10% of their maximal effort.

NOTE Confidence: 0.8590667

00:39:22.666 --> 00:39:25.330 So, again, not directly relevant to

NOTE Confidence: 0.8590667

00:39:25.330 --> 00:39:29.528 athletic performance, but does have some.

NOTE Confidence: 0.8590667

00:39:29.530 --> 00:39:30.694 Some applications here.

NOTE Confidence: 0.8590667

00:39:30.694 --> 00:39:32.634 Now during the habitual sleep

NOTE Confidence: 0.8590667

00:39:32.634 --> 00:39:34.487 condition shown here on the slide.

NOTE Confidence: 0.8590667

00:39:34.490 --> 00:39:36.260 Right now, time to exhaustion.

NOTE Confidence: 0.8590667

00:39:36.260 --> 00:39:38.885 So the amount of time they could

NOTE Confidence: 0.8590667

00:39:38.885 --> 00:39:40.990 sustain that that contraction.

NOTE Confidence: 0.8590667

00:39:40.990 --> 00:39:44.056 Worsened by 7% after sleep deprivation,

NOTE Confidence: 0.8590667

00:39:44.060 --> 00:39:48.156 so that so D0 is pre sleep deprivation.

NOTE Confidence: 0.8590667

00:39:48.160 --> 00:39:51.500 D1 is after sleep deprivation.

NOTE Confidence: 0.8590667

00:39:51.500 --> 00:39:53.780 In the sleep extension condition,

NOTE Confidence: 0.8590667

00:39:53.780 --> 00:39:56.520 time to exhaustion also worsen

NOTE Confidence: 0.8590667

00:39:56.520 --> 00:39:58.164 after sleep deprivation.

NOTE Confidence: 0.8590667

00:39:58.170 --> 00:40:00.320 But it was only three.

NOTE Confidence: 0.8590667

00:40:00.320 --> 00:40:02.156 Point 7% here.

NOTE Confidence: 0.8590667

00:40:02.156 --> 00:40:05.828 So the amount of reduction in

NOTE Confidence: 0.8590667

00:40:05.828 --> 00:40:08.190 performance was attenuated.

NOTE Confidence: 0.8590667

00:40:08.190 --> 00:40:10.162 But even more importantly,

NOTE Confidence: 0.8590667

00:40:10.162 --> 00:40:12.627 in the sleep extension condition,

NOTE Confidence: 0.8590667

00:40:12.630 --> 00:40:15.270 baseline performance was 3.9% better

NOTE Confidence: 0.8590667

00:40:15.270 --> 00:40:18.268 than the habitual condition and then

NOTE Confidence: 0.8590667

00:40:18.268 --> 00:40:20.512 8% better after sleep deprivation.

NOTE Confidence: 0.8590667

00:40:20.512 --> 00:40:22.484 So in other words,  
NOTE Confidence: 0.8590667

00:40:22.490 --> 00:40:25.352 banking sleep lead to better performance  
NOTE Confidence: 0.8590667

00:40:25.352 --> 00:40:28.706 prior to sleep loss and also better  
NOTE Confidence: 0.8590667

00:40:28.706 --> 00:40:31.424 performance after sleep loss or a  
NOTE Confidence: 0.8590667

00:40:31.424 --> 00:40:34.194 smaller attenuation or blunting of  
NOTE Confidence: 0.8590667

00:40:34.194 --> 00:40:37.536 performance impairment after sleep loss so.  
NOTE Confidence: 0.8590667

00:40:37.540 --> 00:40:40.228 Subsequent research really needs to be  
NOTE Confidence: 0.8590667

00:40:40.228 --> 00:40:42.860 performed on this concept of banking,  
NOTE Confidence: 0.8590667

00:40:42.860 --> 00:40:45.740 sleep and more relevant outcomes  
NOTE Confidence: 0.8590667

00:40:45.740 --> 00:40:48.044 related to athletic performance.  
NOTE Confidence: 0.8590667

00:40:48.050 --> 00:40:50.409 But if you're not able to extend  
NOTE Confidence: 0.8590667

00:40:50.409 --> 00:40:52.190 sleep at at at night,  
NOTE Confidence: 0.8590667

00:40:52.190 --> 00:40:54.540 can napping improve performance so?  
NOTE Confidence: 0.8590667

00:40:54.540 --> 00:40:57.585 This study involved a within subject design,  
NOTE Confidence: 0.8590667

00:40:57.590 --> 00:40:59.390 both under both conditions.  
NOTE Confidence: 0.8590667

00:40:59.390 --> 00:41:02.390 Athletes slept from 2300 to 3:00 AM,

NOTE Confidence: 0.8590667

00:41:02.390 --> 00:41:04.570 so four hours of sleep.

NOTE Confidence: 0.8590667

00:41:04.570 --> 00:41:07.377 In one condition they were allowed a

NOTE Confidence: 0.8590667

00:41:07.377 --> 00:41:10.431 30 minute nap around an hour before

NOTE Confidence: 0.8590667

00:41:10.431 --> 00:41:13.616 performance was tested and in the other

NOTE Confidence: 0.8590667

00:41:13.616 --> 00:41:16.773 condition they were not allowed to nap.

NOTE Confidence: 0.8590667

00:41:16.780 --> 00:41:20.260 So this is a wide variety of performance.

NOTE Confidence: 0.8590667

00:41:20.260 --> 00:41:21.568 Markers were assessed,

NOTE Confidence: 0.8590667

00:41:21.568 --> 00:41:24.184 but I'm only showing 2 here,

NOTE Confidence: 0.8590667

00:41:24.190 --> 00:41:25.104 they found.

NOTE Confidence: 0.8590667

00:41:25.104 --> 00:41:26.932 State spring performance was

NOTE Confidence: 0.8590667

00:41:26.932 --> 00:41:28.760 significantly improved under the

NOTE Confidence: 0.8590667

00:41:28.831 --> 00:41:30.741 napping condition and then using

NOTE Confidence: 0.8590667

00:41:30.741 --> 00:41:33.134 the digits pintat digit span task

NOTE Confidence: 0.8590667

00:41:33.134 --> 00:41:34.790 test that assesses short-term

NOTE Confidence: 0.8590667

00:41:34.790 --> 00:41:36.860 memory they found a significant

NOTE Confidence: 0.8590667

00:41:36.860 --> 00:41:39.630 improvement after napping as well.

NOTE Confidence: 0.8590667

00:41:39.630 --> 00:41:40.198 So again,

NOTE Confidence: 0.8590667

00:41:40.198 --> 00:41:41.618 showing that the potential for

NOTE Confidence: 0.8590667

00:41:41.618 --> 00:41:42.907 napping to improve performance

NOTE Confidence: 0.8590667

00:41:42.907 --> 00:41:44.447 under sleep loss conditions.

NOTE Confidence: 0.8590667

00:41:44.450 --> 00:41:45.092 But again,

NOTE Confidence: 0.8590667

00:41:45.092 --> 00:41:47.660 I did want to point out here too,

NOTE Confidence: 0.8590667

00:41:47.660 --> 00:41:50.220 that this was only a 30 minute nap,

NOTE Confidence: 0.8590667

00:41:50.220 --> 00:41:51.805 so it doesn't necessarily have

NOTE Confidence: 0.8590667

00:41:51.805 --> 00:41:53.750 to be an extensive nap also.

NOTE Confidence: 0.7987993

00:41:56.010 --> 00:41:58.218 So the results from these few

NOTE Confidence: 0.7987993

00:41:58.218 --> 00:42:00.271 last few slides really suggest

NOTE Confidence: 0.7987993

00:42:00.271 --> 00:42:02.307 that simply extending sleep,

NOTE Confidence: 0.7987993

00:42:02.310 --> 00:42:03.903 whether through increasing

NOTE Confidence: 0.7987993

00:42:03.903 --> 00:42:06.558 nocturnal sleep or adding naps.

NOTE Confidence: 0.7987993

00:42:06.560 --> 00:42:08.624 Maybe that's the key to improve

NOTE Confidence: 0.7987993

00:42:08.624 --> 00:42:10.367 performance and some reviews on

NOTE Confidence: 0.7987993

00:42:10.367 --> 00:42:12.185 this topics even suggests as much,

NOTE Confidence: 0.7987993

00:42:12.190 --> 00:42:13.490 with the emphasis being,

NOTE Confidence: 0.7987993

00:42:13.490 --> 00:42:15.440 the athlete should simply get as

NOTE Confidence: 0.7987993

00:42:15.505 --> 00:42:17.708 much sleep as possible, but I.

NOTE Confidence: 0.7987993

00:42:17.708 --> 00:42:20.816 I want to express some caution against

NOTE Confidence: 0.7987993

00:42:20.816 --> 00:42:24.370 this being across the board suggestion.

NOTE Confidence: 0.7987993

00:42:24.370 --> 00:42:26.392 First off, not all studies have

NOTE Confidence: 0.7987993

00:42:26.392 --> 00:42:27.740 found notable improvements in

NOTE Confidence: 0.7987993

00:42:27.796 --> 00:42:29.620 performance with sleep extension,

NOTE Confidence: 0.7987993

00:42:29.620 --> 00:42:32.154 so I don't have time to really

NOTE Confidence: 0.7987993

00:42:32.154 --> 00:42:33.750 go into them here.

NOTE Confidence: 0.7987993

00:42:33.750 --> 00:42:35.676 But multiple studies have found minimal

NOTE Confidence: 0.7987993

00:42:35.676 --> 00:42:38.349 to no impact of sleep extension or

NOTE Confidence: 0.7987993

00:42:38.349 --> 00:42:40.117 napping on subsequent performance.

NOTE Confidence: 0.7987993

00:42:40.120 --> 00:42:42.656 But to me the bigger concern is that  
NOTE Confidence: 0.7987993

00:42:42.656 --> 00:42:45.369 among adults who have difficulties sleeping,  
NOTE Confidence: 0.7987993

00:42:45.370 --> 00:42:46.870 sleep extension may actually  
NOTE Confidence: 0.7987993

00:42:46.870 --> 00:42:47.995 exacerbate these problems.  
NOTE Confidence: 0.7987993

00:42:48.000 --> 00:42:50.088 So instructing athletes who already have  
NOTE Confidence: 0.7987993

00:42:50.088 --> 00:42:52.500 issues falling asleep or maintaining sleep,  
NOTE Confidence: 0.7987993

00:42:52.500 --> 00:42:54.846 asking them to go to bed.  
NOTE Confidence: 0.7987993

00:42:54.850 --> 00:42:57.111 Earlier or stay up or wake up  
NOTE Confidence: 0.7987993

00:42:57.111 --> 00:42:59.481 later that simply may lead to  
NOTE Confidence: 0.7987993

00:42:59.481 --> 00:43:01.245 maladaptive sleep behaviors and  
NOTE Confidence: 0.7987993

00:43:01.245 --> 00:43:03.738 worsen sleep instead of improving it.  
NOTE Confidence: 0.7987993

00:43:03.740 --> 00:43:05.620 So obviously for those people  
NOTE Confidence: 0.7987993

00:43:05.620 --> 00:43:07.124 with severe sleep debt,  
NOTE Confidence: 0.7987993

00:43:07.130 --> 00:43:08.258 sleep extension should.  
NOTE Confidence: 0.8205972

00:43:11.050 --> 00:43:13.192 So of course work and definitely  
NOTE Confidence: 0.8205972

00:43:13.192 --> 00:43:14.984 be encouraged, and in general

NOTE Confidence: 0.8205972

00:43:14.984 --> 00:43:16.780 we should be, you know.

NOTE Confidence: 0.86430717

00:43:18.810 --> 00:43:20.480 Asking athletes to optimize or

NOTE Confidence: 0.86430717

00:43:20.480 --> 00:43:22.730 prioritize sleep as much as possible,

NOTE Confidence: 0.86430717

00:43:22.730 --> 00:43:24.178 but. In most situations,

NOTE Confidence: 0.86430717

00:43:24.178 --> 00:43:27.531 it's just not a one size fits all solution

NOTE Confidence: 0.86430717

00:43:27.531 --> 00:43:30.929 and it shouldn't be the end goal in itself,

NOTE Confidence: 0.86430717

00:43:30.930 --> 00:43:32.565 and again with differences between

NOTE Confidence: 0.86430717

00:43:32.565 --> 00:43:33.546 sports between individuals,

NOTE Confidence: 0.86430717

00:43:33.550 --> 00:43:36.483 it likely is going to require an

NOTE Confidence: 0.86430717

00:43:36.483 --> 00:43:38.949 individualized approach to improving sleep.

NOTE Confidence: 0.86430717

00:43:38.950 --> 00:43:42.338 Now I don't have time to present.

NOTE Confidence: 0.86430717

00:43:42.340 --> 00:43:44.026 Other studies that have looked at

NOTE Confidence: 0.86430717

00:43:44.026 --> 00:43:45.780 intervening on sleep and performance,

NOTE Confidence: 0.86430717

00:43:45.780 --> 00:43:48.040 but suffice to say that.

NOTE Confidence: 0.86430717

00:43:48.040 --> 00:43:49.748 Simple short-term sleep hygiene

NOTE Confidence: 0.86430717



00:43:49.748 --> 00:43:51.456 interventions haven't really shown  
NOTE Confidence: 0.86430717

00:43:51.456 --> 00:43:54.144 that much in terms of being effective  
NOTE Confidence: 0.86430717

00:43:54.144 --> 00:43:55.914 at improving sleep or significantly  
NOTE Confidence: 0.86430717

00:43:55.976 --> 00:43:58.336 improving performance in athletes samples.  
NOTE Confidence: 0.86430717

00:43:58.340 --> 00:43:59.327 In my opinion,  
NOTE Confidence: 0.86430717

00:43:59.327 --> 00:44:01.630 the Gold Standard approach is to provide  
NOTE Confidence: 0.86430717

00:44:01.693 --> 00:44:04.208 a multi component sleep intervention  
NOTE Confidence: 0.86430717

00:44:04.208 --> 00:44:06.220 that incorporates comprehensive sleep  
NOTE Confidence: 0.86430717

00:44:06.220 --> 00:44:08.639 education and screening for all athletes,  
NOTE Confidence: 0.86430717

00:44:08.640 --> 00:44:10.131 providing personalized feedback  
NOTE Confidence: 0.86430717

00:44:10.131 --> 00:44:12.616 and then also providing tailored  
NOTE Confidence: 0.86430717

00:44:12.616 --> 00:44:14.849 approaches to improving sleep in  
NOTE Confidence: 0.86430717

00:44:14.849 --> 00:44:16.794 those individuals who are identified  
NOTE Confidence: 0.86430717

00:44:16.794 --> 00:44:19.170 to be in need of intervention.  
NOTE Confidence: 0.86430717

00:44:19.170 --> 00:44:21.570 So a good example of this type of  
NOTE Confidence: 0.86430717

00:44:21.570 --> 00:44:23.510 approach comes from some Finnish

NOTE Confidence: 0.86430717

00:44:23.510 --> 00:44:25.210 authors who studied professional

NOTE Confidence: 0.86430717

00:44:25.210 --> 00:44:27.696 hockey players in implemented a program

NOTE Confidence: 0.86430717

00:44:27.696 --> 00:44:29.988 similar to what I just described.

NOTE Confidence: 0.86430717

00:44:29.990 --> 00:44:32.330 They screened all the athletes provided

NOTE Confidence: 0.86430717

00:44:32.330 --> 00:44:34.460 sleep education to all of them,

NOTE Confidence: 0.86430717

00:44:34.460 --> 00:44:36.650 and then they followed up with

NOTE Confidence: 0.86430717

00:44:36.650 --> 00:44:38.110 individualized treatment programs to

NOTE Confidence: 0.86430717

00:44:38.166 --> 00:44:40.802 the approximately 20% or so who were

NOTE Confidence: 0.86430717

00:44:40.802 --> 00:44:43.040 suspected to have a sleep disorder,

NOTE Confidence: 0.86430717

00:44:43.040 --> 00:44:44.528 and they found significant

NOTE Confidence: 0.86430717

00:44:44.528 --> 00:44:45.644 improvements in sleep.

NOTE Confidence: 0.86430717

00:44:45.650 --> 00:44:47.231 Based on this,

NOTE Confidence: 0.86430717

00:44:47.231 --> 00:44:49.339 more comprehensive sleep intervention.

NOTE Confidence: 0.86430717

00:44:49.340 --> 00:44:51.014 In a couple other studies have

NOTE Confidence: 0.86430717

00:44:51.014 --> 00:44:52.570 utilized a similar approach to this,

NOTE Confidence: 0.86430717

00:44:52.570 --> 00:44:53.035 but.

NOTE Confidence: 0.86430717

00:44:53.035 --> 00:44:55.360 The problem not really problem,

NOTE Confidence: 0.86430717

00:44:55.360 --> 00:44:57.418 but it's that they haven't really

NOTE Confidence: 0.86430717

00:44:57.418 --> 00:44:59.132 included any objective measures of

NOTE Confidence: 0.86430717

00:44:59.132 --> 00:45:00.842 performance to see if improving sleep

NOTE Confidence: 0.86430717

00:45:00.842 --> 00:45:02.809 also leads to improve performance.

NOTE Confidence: 0.82864404

00:45:05.350 --> 00:45:07.380 So one more section to go here.

NOTE Confidence: 0.82864404

00:45:07.380 --> 00:45:09.683 I did want to review some of

NOTE Confidence: 0.82864404

00:45:09.683 --> 00:45:10.670 the consensus recommendations

NOTE Confidence: 0.82864404

00:45:10.736 --> 00:45:12.611 that have been developed for

NOTE Confidence: 0.82864404

00:45:12.611 --> 00:45:14.486 practitioners who work with athletes.

NOTE Confidence: 0.82864404

00:45:14.490 --> 00:45:16.905 So I'll start with the first statement.

NOTE Confidence: 0.82864404

00:45:16.910 --> 00:45:18.286 First consensus statement that

NOTE Confidence: 0.82864404

00:45:18.286 --> 00:45:20.006 focused on sleep and athletes,

NOTE Confidence: 0.82864404

00:45:20.010 --> 00:45:21.735 and this was specifically focused

NOTE Confidence: 0.82864404

00:45:21.735 --> 00:45:22.770 on collegiate athletes.

NOTE Confidence: 0.82864404

00:45:22.770 --> 00:45:25.018 Now, I was fortunate to be a part

NOTE Confidence: 0.82864404

00:45:25.018 --> 00:45:27.701 of this as a member of the Inner

NOTE Confidence: 0.82864404

00:45:27.701 --> 00:45:29.939 Association Task Force on Sleep and

NOTE Confidence: 0.82864404

00:45:29.939 --> 00:45:32.321 Wellness that the incident NCAA put

NOTE Confidence: 0.82864404

00:45:32.321 --> 00:45:34.850 put together a couple of years ago,

NOTE Confidence: 0.82864404

00:45:34.850 --> 00:45:37.265 and it began with an in person

NOTE Confidence: 0.82864404

00:45:37.265 --> 00:45:38.300 stomach in 2017,

NOTE Confidence: 0.82864404

00:45:38.300 --> 00:45:39.885 and they continued in smaller

NOTE Confidence: 0.82864404

00:45:39.885 --> 00:45:41.470 group meetings and eventually a

NOTE Confidence: 0.82864404

00:45:41.530 --> 00:45:43.710 writing group that focused on

NOTE Confidence: 0.82864404

00:45:43.710 --> 00:45:45.018 developing consensus recommendations.

NOTE Confidence: 0.82864404

00:45:45.020 --> 00:45:48.220 That were aimed to improve the sleep in

NOTE Confidence: 0.82864404

00:45:48.220 --> 00:45:50.905 collegiate athletes but were aimed to

NOTE Confidence: 0.82864404

00:45:50.905 --> 00:45:53.175 be implemented by collegiate athletic

NOTE Confidence: 0.82864404

00:45:53.175 --> 00:45:55.597 departments so you can see here already.

NOTE Confidence: 0.82864404

00:45:55.600 --> 00:45:57.640 The focus was somewhat unique.  
NOTE Confidence: 0.82864404

00:45:57.640 --> 00:45:58.858 The audience wasn't  
NOTE Confidence: 0.82864404

00:45:58.858 --> 00:46:00.076 specifically the athletes,  
NOTE Confidence: 0.82864404

00:46:00.080 --> 00:46:03.470 but rather the larger ecosystem.  
NOTE Confidence: 0.82864404

00:46:03.470 --> 00:46:05.082 They could facilitate better  
NOTE Confidence: 0.82864404

00:46:05.082 --> 00:46:06.694 sleep for those athletes.  
NOTE Confidence: 0.82864404

00:46:06.700 --> 00:46:09.088 And we utilized something called the  
NOTE Confidence: 0.82864404

00:46:09.088 --> 00:46:11.228 Delphi process to identify recommendations  
NOTE Confidence: 0.82864404

00:46:11.228 --> 00:46:14.108 for those athletic department's and when  
NOTE Confidence: 0.82864404

00:46:14.108 --> 00:46:16.630 we were considering recommendations.  
NOTE Confidence: 0.82864404

00:46:16.630 --> 00:46:18.370 We consider two primary factors  
NOTE Confidence: 0.82864404

00:46:18.370 --> 00:46:20.110 that the recommendation had utility  
NOTE Confidence: 0.82864404

00:46:20.168 --> 00:46:22.368 that it was going to be useful for  
NOTE Confidence: 0.82864404

00:46:22.368 --> 00:46:23.290 improving athletes sleep,  
NOTE Confidence: 0.82864404

00:46:23.290 --> 00:46:25.636 but also that was going to  
NOTE Confidence: 0.82864404

00:46:25.636 --> 00:46:27.200 be feasible to implement.

NOTE Confidence: 0.82864404

00:46:27.200 --> 00:46:28.752 So in the end,

NOTE Confidence: 0.82864404

00:46:28.752 --> 00:46:31.080 our committee had lots of recommendations,

NOTE Confidence: 0.82864404

00:46:31.080 --> 00:46:34.020 but really only a few

NOTE Confidence: 0.82864404

00:46:34.020 --> 00:46:35.784 recommendations made it.

NOTE Confidence: 0.82864404

00:46:35.790 --> 00:46:38.009 They basically made it to the top

NOTE Confidence: 0.82864404

00:46:38.009 --> 00:46:41.099 in terms of deeming being deemed to

NOTE Confidence: 0.82864404

00:46:41.099 --> 00:46:43.674 have sufficient utility an sufficient

NOTE Confidence: 0.82864404

00:46:43.674 --> 00:46:45.818 feasibility from the expert panel.

NOTE Confidence: 0.82864404

00:46:45.820 --> 00:46:48.328 So shown here in this box

NOTE Confidence: 0.82864404

00:46:48.328 --> 00:46:49.582 are those recommendations.

NOTE Confidence: 0.82864404

00:46:49.590 --> 00:46:50.727 So First off,

NOTE Confidence: 0.82864404

00:46:50.727 --> 00:46:52.622 completing an athlete Time Demand

NOTE Confidence: 0.82864404

00:46:52.622 --> 00:46:55.198 survey on an annual basis really

NOTE Confidence: 0.82864404

00:46:55.198 --> 00:46:56.950 chronicling how these athletes

NOTE Confidence: 0.82864404

00:46:56.950 --> 00:46:59.229 are spending their time studying,

NOTE Confidence: 0.82864404

00:46:59.230 --> 00:47:00.116 training,  
NOTE Confidence: 0.82864404

00:47:00.116 --> 00:47:01.888 and sleeping.  
NOTE Confidence: 0.82864404

00:47:01.890 --> 00:47:03.980 Recommendation two was really to  
NOTE Confidence: 0.82864404

00:47:03.980 --> 00:47:06.557 dampen the enthusiasm that at the  
NOTE Confidence: 0.82864404

00:47:06.557 --> 00:47:08.617 time we were perceiving athletic  
NOTE Confidence: 0.82864404

00:47:08.617 --> 00:47:11.599 departments to be moving toward a lot  
NOTE Confidence: 0.82864404

00:47:11.599 --> 00:47:13.709 of commercial devices for monitoring,  
NOTE Confidence: 0.82864404

00:47:13.710 --> 00:47:16.185 sleep and just really pointing  
NOTE Confidence: 0.82864404

00:47:16.185 --> 00:47:18.660 out the potential privacy laws  
NOTE Confidence: 0.82864404

00:47:18.749 --> 00:47:21.347 that could be in question there.  
NOTE Confidence: 0.82864404

00:47:21.350 --> 00:47:22.778 Recommendation three involved  
NOTE Confidence: 0.82864404

00:47:22.778 --> 00:47:24.682 incorporating sleep screening as  
NOTE Confidence: 0.82864404

00:47:24.682 --> 00:47:27.148 a standard part of the athletes.  
NOTE Confidence: 0.82864404

00:47:27.150 --> 00:47:28.863 Preparticipation screening exam.  
NOTE Confidence: 0.82864404

00:47:28.863 --> 00:47:30.576 And then recommendations.  
NOTE Confidence: 0.82864404

00:47:30.580 --> 00:47:32.905 Four and five really providing

NOTE Confidence: 0.82864404

00:47:32.905 --> 00:47:34.765 comprehensive sleep education to

NOTE Confidence: 0.82864404

00:47:34.765 --> 00:47:37.529 both the athletes but also the

NOTE Confidence: 0.82864404

00:47:37.529 --> 00:47:39.309 coaching staff and surrounding

NOTE Confidence: 0.82864404

00:47:39.309 --> 00:47:40.849 athletic training staff.

NOTE Confidence: 0.82864404

00:47:40.850 --> 00:47:41.432 So overall,

NOTE Confidence: 0.82864404

00:47:41.432 --> 00:47:44.144 I'm not sure how much of an F how

NOTE Confidence: 0.82864404

00:47:44.144 --> 00:47:46.314 much of an impact this is made,

NOTE Confidence: 0.82864404

00:47:46.320 --> 00:47:47.754 the consensus recommendation.

NOTE Confidence: 0.82864404

00:47:47.754 --> 00:47:49.666 The recommendations were published

NOTE Confidence: 0.82864404

00:47:49.666 --> 00:47:52.580 just middle of 2019, and you know,

NOTE Confidence: 0.82864404

00:47:52.580 --> 00:47:54.800 I've worked with a couple of

NOTE Confidence: 0.82864404

00:47:54.800 --> 00:47:56.699 institutions because of this

NOTE Confidence: 0.82864404

00:47:56.699 --> 00:47:57.669 consensus statement.

NOTE Confidence: 0.82864404

00:47:57.670 --> 00:48:01.051 Pitt and a couple of smaller schools

NOTE Confidence: 0.82864404

00:48:01.051 --> 00:48:03.352 in Western PA. But it's been.

NOTE Confidence: 0.82864404



00:48:03.352 --> 00:48:05.056 It's been difficult to convince them  
NOTE Confidence: 0.82864404

00:48:05.056 --> 00:48:07.500 to implement some of these recommendations,  
NOTE Confidence: 0.82864404

00:48:07.500 --> 00:48:09.570 and that that was really our  
NOTE Confidence: 0.82864404

00:48:09.570 --> 00:48:11.546 fear all along regarding the  
NOTE Confidence: 0.82864404

00:48:11.546 --> 00:48:13.662 feasibility of implementations by  
NOTE Confidence: 0.82864404

00:48:13.662 --> 00:48:15.249 these athletic departments.  
NOTE Confidence: 0.82864404

00:48:15.250 --> 00:48:17.600 Now recently it's still impress.  
NOTE Confidence: 0.82864404

00:48:17.600 --> 00:48:18.123 Actually,  
NOTE Confidence: 0.82864404

00:48:18.123 --> 00:48:19.692 consensus recommendations were  
NOTE Confidence: 0.82864404

00:48:19.692 --> 00:48:22.307 provided for managing sleep in  
NOTE Confidence: 0.82864404

00:48:22.307 --> 00:48:25.182 elite athletes and as part of this  
NOTE Confidence: 0.82864404

00:48:25.182 --> 00:48:27.265 this document they provided asleep  
NOTE Confidence: 0.82864404

00:48:27.265 --> 00:48:29.710 toolbox that they recommended for  
NOTE Confidence: 0.82864404

00:48:29.710 --> 00:48:31.666 sleep practitioners to utilized  
NOTE Confidence: 0.81610715

00:48:31.670 --> 00:48:33.478 when working with athletes,  
NOTE Confidence: 0.81610715

00:48:33.478 --> 00:48:35.286 and this toolbox consisted

NOTE Confidence: 0.81610715

00:48:35.286 --> 00:48:37.290 of four primary tools.

NOTE Confidence: 0.81610715

00:48:37.290 --> 00:48:39.114 One educate the athletes,

NOTE Confidence: 0.81610715

00:48:39.114 --> 00:48:42.412 including on their sleep need the use

NOTE Confidence: 0.81610715

00:48:42.412 --> 00:48:44.797 of daytime napping to supplement,

NOTE Confidence: 0.81610715

00:48:44.800 --> 00:48:46.309 but not replace.

NOTE Confidence: 0.81610715

00:48:46.309 --> 00:48:48.824 Nighttime sleep proper sleep hygiene

NOTE Confidence: 0.81610715

00:48:48.824 --> 00:48:50.820 awareness of their chronotype

NOTE Confidence: 0.81610715

00:48:50.820 --> 00:48:53.562 and also just a cautionary tale

NOTE Confidence: 0.81610715

00:48:53.562 --> 00:48:56.080 about using commercial monitors.

NOTE Confidence: 0.81610715

00:48:56.080 --> 00:48:57.792 And they also recommended

NOTE Confidence: 0.81610715

00:48:57.792 --> 00:48:59.504 screening for all athletes,

NOTE Confidence: 0.81610715

00:48:59.510 --> 00:49:01.618 specifically the use of.

NOTE Confidence: 0.81610715

00:49:01.618 --> 00:49:03.199 Athlete specific sleep.

NOTE Confidence: 0.81610715

00:49:03.200 --> 00:49:05.105 Screening tools that I'll mention

NOTE Confidence: 0.81610715

00:49:05.105 --> 00:49:07.914 on the on the next slide and

NOTE Confidence: 0.81610715

00:49:07.914 --> 00:49:09.969 then third strong emphasis that  
NOTE Confidence: 0.81610715

00:49:09.969 --> 00:49:12.380 they placed on utilizing naps,  
NOTE Confidence: 0.81610715

00:49:12.380 --> 00:49:15.596 including how to properly diploid them.  
NOTE Confidence: 0.81610715

00:49:15.600 --> 00:49:17.260 Uh.  
NOTE Confidence: 0.81610715

00:49:17.260 --> 00:49:17.976 But again,  
NOTE Confidence: 0.81610715

00:49:17.976 --> 00:49:19.766 viewing that naps as supplementing  
NOTE Confidence: 0.81610715

00:49:19.766 --> 00:49:21.270 nighttime sleep instead of  
NOTE Confidence: 0.81610715

00:49:21.270 --> 00:49:22.398 replacing nighttime sleep,  
NOTE Confidence: 0.81610715

00:49:22.400 --> 00:49:24.665 and then finally this concept  
NOTE Confidence: 0.81610715

00:49:24.665 --> 00:49:26.930 of banking or extending sleep.  
NOTE Confidence: 0.81610715

00:49:26.930 --> 00:49:29.800 But the emphasis here was really on  
NOTE Confidence: 0.81610715

00:49:29.800 --> 00:49:32.030 obtaining sufficient sleep in the months,  
NOTE Confidence: 0.81610715

00:49:32.030 --> 00:49:32.388 weeks,  
NOTE Confidence: 0.81610715

00:49:32.388 --> 00:49:34.178 days prior to an important  
NOTE Confidence: 0.81610715

00:49:34.178 --> 00:49:35.610 competition to safeguard the  
NOTE Confidence: 0.81610715

00:49:35.671 --> 00:49:37.375 athlete against the occasional

NOTE Confidence: 0.81610715

00:49:37.375 --> 00:49:39.079 night of insufficient sleep,

NOTE Confidence: 0.81610715

00:49:39.080 --> 00:49:40.648 especially right before competition.

NOTE Confidence: 0.8461048

00:49:42.800 --> 00:49:44.642 So there have been two screening

NOTE Confidence: 0.8461048

00:49:44.642 --> 00:49:46.404 tools that have been developed

NOTE Confidence: 0.8461048

00:49:46.404 --> 00:49:47.814 specifically for identifying

NOTE Confidence: 0.8461048

00:49:47.814 --> 00:49:50.164 sleep problems in athlete samples.

NOTE Confidence: 0.8461048

00:49:50.170 --> 00:49:52.110 The first was the athlete

NOTE Confidence: 0.8461048

00:49:52.110 --> 00:49:53.274 Sleep Screening Questionnaire,

NOTE Confidence: 0.8461048

00:49:53.280 --> 00:49:55.596 much more of a diagnostic measure.

NOTE Confidence: 0.84661293

00:49:58.080 --> 00:49:59.750 And then the athlete Sleep

NOTE Confidence: 0.84661293

00:49:59.750 --> 00:50:00.418 Behavior questionnaire.

NOTE Confidence: 0.84661293

00:50:00.420 --> 00:50:02.996 Really has a greater emphasis on sleep.

NOTE Confidence: 0.84661293

00:50:03.000 --> 00:50:04.840 Hygiene consists of 18 items.

NOTE Confidence: 0.84661293

00:50:04.840 --> 00:50:07.332 Not sure if you can see the

NOTE Confidence: 0.84661293

00:50:07.332 --> 00:50:09.619 individual items on the slide here.

NOTE Confidence: 0.84661293

00:50:09.620 --> 00:50:11.874 It doesn't really do much to identify  
NOTE Confidence: 0.84661293

00:50:11.874 --> 00:50:13.768 sleep disorders like the athlete  
NOTE Confidence: 0.84661293

00:50:13.768 --> 00:50:15.508 Sleep Screening Questionnaire does,  
NOTE Confidence: 0.84661293

00:50:15.510 --> 00:50:17.806 but it could be useful for identifying  
NOTE Confidence: 0.84661293

00:50:17.806 --> 00:50:20.290 potential areas of improvement for athletes,  
NOTE Confidence: 0.84661293

00:50:20.290 --> 00:50:22.015 so these were developed because  
NOTE Confidence: 0.84661293

00:50:22.015 --> 00:50:24.208 of the perceived need for more  
NOTE Confidence: 0.84661293

00:50:24.208 --> 00:50:25.808 specific tools for athletes.  
NOTE Confidence: 0.84661293

00:50:25.810 --> 00:50:28.491 But I still think you know the  
NOTE Confidence: 0.84661293

00:50:28.491 --> 00:50:30.719 more standard tools of the piski.  
NOTE Confidence: 0.84661293

00:50:30.720 --> 00:50:34.746 The ISI, those still should identify  
NOTE Confidence: 0.84661293

00:50:34.746 --> 00:50:37.430 most athletes sufficiently well.  
NOTE Confidence: 0.84661293

00:50:37.430 --> 00:50:39.570 So overall.  
NOTE Confidence: 0.84661293

00:50:39.570 --> 00:50:41.980 There's really been an explosion  
NOTE Confidence: 0.84661293

00:50:41.980 --> 00:50:43.426 of research of.  
NOTE Confidence: 0.84661293

00:50:43.430 --> 00:50:45.980 Explosion of interest and research and

NOTE Confidence: 0.84661293

00:50:45.980 --> 00:50:48.000 sleep enough like performance but.

NOTE Confidence: 0.84661293

00:50:48.000 --> 00:50:50.200 Much of the available evidence,

NOTE Confidence: 0.84661293

00:50:50.200 --> 00:50:52.335 even though it certainly suggests

NOTE Confidence: 0.84661293

00:50:52.335 --> 00:50:53.616 a significant relationship

NOTE Confidence: 0.84661293

00:50:53.616 --> 00:50:55.459 between sleep and performance.

NOTE Confidence: 0.84661293

00:50:55.460 --> 00:50:58.100 It's generally low quality and generally,

NOTE Confidence: 0.84661293

00:50:58.100 --> 00:50:59.369 though in general,

NOTE Confidence: 0.84661293

00:50:59.369 --> 00:50:59.792 though,

NOTE Confidence: 0.84661293

00:50:59.792 --> 00:51:02.330 we see that sleep disturbances prevalent

NOTE Confidence: 0.84661293

00:51:02.393 --> 00:51:05.117 among athletes and whether it's voluntary

NOTE Confidence: 0.84661293

00:51:05.117 --> 00:51:07.760 curtailment or insomnia driven by insomnia,

NOTE Confidence: 0.84661293

00:51:07.760 --> 00:51:10.388 there's also evidence that sleep loss,

NOTE Confidence: 0.84661293

00:51:10.390 --> 00:51:12.222 especially over multiple nights,

NOTE Confidence: 0.84661293

00:51:12.222 --> 00:51:14.512 impacts multiple parameters that are

NOTE Confidence: 0.84661293

00:51:14.512 --> 00:51:16.966 relevant to both performance and recovery.

NOTE Confidence: 0.84661293

00:51:16.970 --> 00:51:18.542 And while existing research.  
NOTE Confidence: 0.84661293

00:51:18.542 --> 00:51:20.114 Doesn't point to interventions  
NOTE Confidence: 0.84661293

00:51:20.114 --> 00:51:21.887 that are especially effective  
NOTE Confidence: 0.84661293

00:51:21.887 --> 00:51:23.735 aside from sleep extension,  
NOTE Confidence: 0.84661293

00:51:23.740 --> 00:51:26.386 there's many different ways that natly  
NOTE Confidence: 0.84661293

00:51:26.386 --> 00:51:29.369 can improve their sleep and hopefully  
NOTE Confidence: 0.84661293

00:51:29.369 --> 00:51:31.649 optimize performance and recovery.  
NOTE Confidence: 0.84661293

00:51:31.650 --> 00:51:34.345 So with that I'm sorry and then  
NOTE Confidence: 0.84661293

00:51:34.345 --> 00:51:35.890 consensus recommendations as well.  
NOTE Confidence: 0.84661293

00:51:35.890 --> 00:51:36.297 Again,  
NOTE Confidence: 0.84661293

00:51:36.297 --> 00:51:39.146 pointing out the need for greater research  
NOTE Confidence: 0.84661293

00:51:39.146 --> 00:51:41.155 to better inform our recommendations  
NOTE Confidence: 0.84661293

00:51:41.155 --> 00:51:44.545 that we can make and how to how to  
NOTE Confidence: 0.84661293

00:51:44.545 --> 00:51:46.669 work and manage sleep in athletes.  
NOTE Confidence: 0.84661293

00:51:46.670 --> 00:51:47.822 OK with that,  
NOTE Confidence: 0.84661293

00:51:47.822 --> 00:51:50.126 I'm happy to take any questions.

NOTE Confidence: 0.85124034

00:51:51.330 --> 00:51:53.988 Great, thank you so much. Doctor Klein.

NOTE Confidence: 0.85124034

00:51:53.988 --> 00:51:57.020 That was a wonderful overview of a topic

NOTE Confidence: 0.85124034

00:51:57.092 --> 00:51:59.689 we really don't talk about that much.

NOTE Confidence: 0.85124034

00:51:59.690 --> 00:52:01.970 An I think warrant more attention.

NOTE Confidence: 0.85124034

00:52:01.970 --> 00:52:05.202 I'll start off with the question and if

NOTE Confidence: 0.85124034

00:52:05.202 --> 00:52:08.426 others would like to post them in the chat,

NOTE Confidence: 0.85124034

00:52:08.430 --> 00:52:10.710 please feel free to do so.

NOTE Confidence: 0.85124034

00:52:10.710 --> 00:52:12.964 So most of the research that you

NOTE Confidence: 0.85124034

00:52:12.964 --> 00:52:14.477 reviewed related to competitive

NOTE Confidence: 0.85124034

00:52:14.477 --> 00:52:16.409 athletes at various levels.

NOTE Confidence: 0.85124034

00:52:16.410 --> 00:52:18.310 And I was just curious.

NOTE Confidence: 0.85124034

00:52:18.310 --> 00:52:20.210 The outcomes were often relating

NOTE Confidence: 0.85124034

00:52:20.210 --> 00:52:22.395 to their sort of performance, but.

NOTE Confidence: 0.85124034

00:52:22.395 --> 00:52:24.960 Many of us who kind of exercise in non

NOTE Confidence: 0.85124034

00:52:25.032 --> 00:52:27.342 competitive arenas were not as much

NOTE Confidence: 0.85124034



00:52:27.342 --> 00:52:30.079 interested in how many miles we can run,  
NOTE Confidence: 0.85124034

00:52:30.080 --> 00:52:32.376 but what's the benefit to our health?  
NOTE Confidence: 0.85124034

00:52:32.380 --> 00:52:34.348 How many calories can we burn?  
NOTE Confidence: 0.85124034

00:52:34.350 --> 00:52:35.514 And and you know,  
NOTE Confidence: 0.85124034

00:52:35.514 --> 00:52:38.732 should we try to go to the gym at least  
NOTE Confidence: 0.85124034

00:52:38.732 --> 00:52:41.559 an ANCOVA times after six hours of sleep?  
NOTE Confidence: 0.85124034

00:52:41.560 --> 00:52:43.863 Or are we going to have a  
NOTE Confidence: 0.85124034

00:52:43.863 --> 00:52:45.499 better workout after 8 hours?  
NOTE Confidence: 0.85124034

00:52:45.500 --> 00:52:47.402 I know you mentioned that in  
NOTE Confidence: 0.85124034

00:52:47.402 --> 00:52:49.110 general after just one night,  
NOTE Confidence: 0.85124034

00:52:49.110 --> 00:52:50.976 at least in competitive athletes that  
NOTE Confidence: 0.85124034

00:52:50.976 --> 00:52:52.720 they are not tremendously impacted.  
NOTE Confidence: 0.85124034

00:52:52.720 --> 00:52:55.065 But it's just much harder to actually.  
NOTE Confidence: 0.85124034

00:52:55.070 --> 00:52:55.994 Do that workout.  
NOTE Confidence: 0.85124034

00:52:55.994 --> 00:52:58.150 But what do we know about kind  
NOTE Confidence: 0.85124034

00:52:58.215 --> 00:53:00.047 of non competitive athletes?

NOTE Confidence: 0.83849573

00:53:01.740 --> 00:53:05.070 Well, that could be another presentation

NOTE Confidence: 0.83849573

00:53:05.070 --> 00:53:08.748 on itself, but. In general,

NOTE Confidence: 0.83849573

00:53:08.748 --> 00:53:11.260 I get that question asked a lot about.

NOTE Confidence: 0.83849573

00:53:11.260 --> 00:53:14.086 You know there's only 24 hours in a day,

NOTE Confidence: 0.83849573

00:53:14.090 --> 00:53:16.706 an oftentimes non athletes have to

NOTE Confidence: 0.83849573

00:53:16.706 --> 00:53:18.847 choose between getting that seven

NOTE Confidence: 0.83849573

00:53:18.847 --> 00:53:21.108 8 hours or getting up a little

NOTE Confidence: 0.83849573

00:53:21.108 --> 00:53:23.307 bit early and going to the gym.

NOTE Confidence: 0.83849573

00:53:23.310 --> 00:53:26.325 And I I always weasel out of that answer,

NOTE Confidence: 0.83849573

00:53:26.330 --> 00:53:28.000 because I don't want to.

NOTE Confidence: 0.83849573

00:53:28.000 --> 00:53:30.345 I don't want to anger either side,

NOTE Confidence: 0.83849573

00:53:30.350 --> 00:53:31.355 but in general,

NOTE Confidence: 0.83849573

00:53:31.355 --> 00:53:33.700 if an athlete is if non athlete.

NOTE Confidence: 0.83849573

00:53:33.700 --> 00:53:37.420 If a general individual is able to obtain

NOTE Confidence: 0.83849573

00:53:37.420 --> 00:53:39.610 relatively sufficient amount of sleep.

NOTE Confidence: 0.83849573

00:53:39.610 --> 00:53:43.948 It to me allocating 45 minutes

NOTE Confidence: 0.83849573

00:53:43.948 --> 00:53:46.840 to exercise rather than.

NOTE Confidence: 0.83849573

00:53:46.840 --> 00:53:49.136 Moving from 6 1/2 to a little

NOTE Confidence: 0.83849573

00:53:49.136 --> 00:53:51.737 over 7 hours of sleep may be

NOTE Confidence: 0.83849573

00:53:51.737 --> 00:53:54.035 beneficial on a short term basis.

NOTE Confidence: 0.83849573

00:53:54.040 --> 00:53:55.875 There are some studies coming

NOTE Confidence: 0.83849573

00:53:55.875 --> 00:53:58.173 out now that suggests that under

NOTE Confidence: 0.83849573

00:53:58.173 --> 00:54:00.138 conditions of sleep loss exercise

NOTE Confidence: 0.83849573

00:54:00.138 --> 00:54:02.213 helps sort of rescue metabolic

NOTE Confidence: 0.83849573

00:54:02.213 --> 00:54:04.799 function into being more normal and.

NOTE Confidence: 0.83849573

00:54:04.800 --> 00:54:07.390 And not demonstrating the impaired

NOTE Confidence: 0.83849573

00:54:07.390 --> 00:54:09.980 metabolic function that you would

NOTE Confidence: 0.83849573

00:54:10.064 --> 00:54:12.200 see with with sleep loss so.

NOTE Confidence: 0.83849573

00:54:12.200 --> 00:54:16.897 No firm answer there, but I guess.

NOTE Confidence: 0.83849573

00:54:16.900 --> 00:54:19.476 It does seem to be an emerging area

NOTE Confidence: 0.83849573

00:54:19.476 --> 00:54:22.244 of research of research that sort of

NOTE Confidence: 0.83849573

00:54:22.244 --> 00:54:24.299 looks at comparing and contrasting,

NOTE Confidence: 0.83849573

00:54:24.300 --> 00:54:25.780 allocating time to exercise

NOTE Confidence: 0.83849573

00:54:25.780 --> 00:54:28.850 versus versus sleep, so it's.

NOTE Confidence: 0.83849573

00:54:28.850 --> 00:54:31.727 I think I sufficiently weaseled my way

NOTE Confidence: 0.84066767

00:54:31.730 --> 00:54:33.790 of that out of that.

NOTE Confidence: 0.84066767

00:54:33.790 --> 00:54:36.268 In fact, I ask a question.

NOTE Confidence: 0.84066767

00:54:36.270 --> 00:54:37.915 Yeah, please go ahead,

NOTE Confidence: 0.84066767

00:54:37.915 --> 00:54:40.800 we thank you for the nice review.

NOTE Confidence: 0.84066767

00:54:40.800 --> 00:54:42.030 Having experience poor

NOTE Confidence: 0.84066767

00:54:42.030 --> 00:54:44.090 sleep during high altitude mountaineering.

NOTE Confidence: 0.84066767

00:54:44.090 --> 00:54:46.569 I was kind of wondering what

NOTE Confidence: 0.84066767

00:54:46.570 --> 00:54:49.036 is the mechanism or what are

NOTE Confidence: 0.84066767

00:54:49.040 --> 00:54:51.100 the mechanisms by which the

NOTE Confidence: 0.84066767

00:54:51.100 --> 00:54:52.748 organs start to malfunction.

NOTE Confidence: 0.84066767

00:54:52.750 --> 00:54:55.216 If they do like such as

NOTE Confidence: 0.84066767

00:54:55.216 --> 00:54:58.618 cardiac and muscular level.  
NOTE Confidence: 0.84066767

00:54:58.620 --> 00:55:00.695 And you're talking about at  
NOTE Confidence: 0.84066767

00:55:00.695 --> 00:55:02.355 high altitude, high altitude.  
NOTE Confidence: 0.84066767

00:55:02.355 --> 00:55:03.600 I understand that  
NOTE Confidence: 0.8030392

00:55:03.600 --> 00:55:06.090 hypoxia is going to have a  
NOTE Confidence: 0.8030392

00:55:06.090 --> 00:55:08.165 major effect on both the  
NOTE Confidence: 0.8030392

00:55:08.165 --> 00:55:09.412 neurocognitive dysfunction and  
NOTE Confidence: 0.8030392

00:55:09.412 --> 00:55:11.490 obviously oxygen transport, but having  
NOTE Confidence: 0.8030392

00:55:11.490 --> 00:55:14.178 experienced poor sleep.  
NOTE Confidence: 0.8030392

00:55:14.180 --> 00:55:18.070 Without hypoxia, potentially can affect  
NOTE Confidence: 0.8030392

00:55:18.070 --> 00:55:21.840 the peripheral system functions.  
NOTE Confidence: 0.8030392

00:55:21.840 --> 00:55:25.099 Any any feelings about the potential  
NOTE Confidence: 0.8030392

00:55:25.100 --> 00:55:28.180 mechanisms that can poor sleep  
NOTE Confidence: 0.8030392

00:55:28.180 --> 00:55:31.780 affect their peripheral function?  
NOTE Confidence: 0.8030392

00:55:31.780 --> 00:55:34.369 There is some sort of negative  
NOTE Confidence: 0.7622087

00:55:34.370 --> 00:55:36.094 component, right? Yeah, yeah.

NOTE Confidence: 0.7622087

00:55:36.094 --> 00:55:39.110 So more at the muscular level and

NOTE Confidence: 0.7622087

00:55:39.110 --> 00:55:43.520 the cardiac, yeah. And their client.

NOTE Confidence: 0.7622087

00:55:43.520 --> 00:55:47.144 So there seems to be a greater under

NOTE Confidence: 0.7622087

00:55:47.144 --> 00:55:50.168 sleep loss conditions a greater.

NOTE Confidence: 0.8300327

00:55:52.240 --> 00:55:54.604 There does seem to be increased

NOTE Confidence: 0.8300327

00:55:54.604 --> 00:55:57.201 sympathetic tone to the muscles to

NOTE Confidence: 0.8300327

00:55:57.201 --> 00:55:59.566 the cardiac musculature leading to

NOTE Confidence: 0.8300327

00:55:59.566 --> 00:56:01.920 increased heart rate under sleep.

NOTE Confidence: 0.8300327

00:56:01.920 --> 00:56:03.680 Loss conditions for a

NOTE Confidence: 0.8300327

00:56:03.680 --> 00:56:05.000 given exercise intensity.

NOTE Confidence: 0.8300327

00:56:05.000 --> 00:56:08.175 Obviously it at maximal effort

NOTE Confidence: 0.8300327

00:56:08.175 --> 00:56:10.715 you're already at maximal.

NOTE Confidence: 0.8300327

00:56:10.720 --> 00:56:14.700 Maximum heart rate also at.

NOTE Confidence: 0.8300327

00:56:14.700 --> 00:56:17.016 No maximal sympathetic outflow,

NOTE Confidence: 0.8300327

00:56:17.016 --> 00:56:20.490 so that isn't necessarily the issue,

NOTE Confidence: 0.8300327

00:56:20.490 --> 00:56:25.692 but it sort of gets to the submaximal effort.

NOTE Confidence: 0.8300327

00:56:25.700 --> 00:56:31.166 It's harder, both physiologically, but also.

NOTE Confidence: 0.8300327

00:56:31.170 --> 00:56:33.710 In terms of perceived effort,

NOTE Confidence: 0.8300327

00:56:33.710 --> 00:56:36.240 so sympathetic activity is greater,

NOTE Confidence: 0.8300327

00:56:36.240 --> 00:56:38.780 there does seem to be.

NOTE Confidence: 0.83541733

00:56:40.930 --> 00:56:43.826 You know, I didn't allude to it too

NOTE Confidence: 0.83541733

00:56:43.826 --> 00:56:46.464 much here, but there does seem to be

NOTE Confidence: 0.83541733

00:56:46.464 --> 00:56:49.031 impaired feedback from the brain to the

NOTE Confidence: 0.83541733

00:56:49.031 --> 00:56:51.066 musculature under sleep loss conditions.

NOTE Confidence: 0.83541733

00:56:51.070 --> 00:56:52.790 So the commands coming down

NOTE Confidence: 0.83541733

00:56:52.790 --> 00:56:55.050 from the brain aren't as strong.

NOTE Confidence: 0.83541733

00:56:55.050 --> 00:56:57.584 It takes us stronger studies have done

NOTE Confidence: 0.83541733

00:56:57.584 --> 00:56:58.670 transcranial magnetic stimulation,

NOTE Confidence: 0.83541733

00:56:58.670 --> 00:57:01.118 and it takes a stronger impulse

NOTE Confidence: 0.83541733

00:57:01.118 --> 00:57:03.193 under sleep loss conditions to

NOTE Confidence: 0.83541733

00:57:03.193 --> 00:57:05.038 get the same muscular output.

NOTE Confidence: 0.83541733

00:57:05.040 --> 00:57:06.369 Um? But overall,

NOTE Confidence: 0.83541733

00:57:06.369 --> 00:57:08.584 I mean most studies haven't

NOTE Confidence: 0.83541733

00:57:08.584 --> 00:57:11.078 really looked at those mechanisms,

NOTE Confidence: 0.83541733

00:57:11.080 --> 00:57:13.850 so those to me are the main ones that have

NOTE Confidence: 0.83541733

00:57:13.920 --> 00:57:16.428 been relatively decently interrogated,

NOTE Confidence: 0.83541733

00:57:16.430 --> 00:57:20.154 and both of those have been shown

NOTE Confidence: 0.83541733

00:57:20.154 --> 00:57:21.750 to be actual.

NOTE Confidence: 0.83541733

00:57:21.750 --> 00:57:23.238 Prominent mechanisms for

NOTE Confidence: 0.83541733

00:57:23.238 --> 00:57:25.222 experiencing the decrements that

NOTE Confidence: 0.83541733

00:57:25.222 --> 00:57:28.368 you can see at submaximal efforts.

NOTE Confidence: 0.8419057

00:57:29.720 --> 00:57:32.380 Great thank you and I think one

NOTE Confidence: 0.8419057

00:57:32.380 --> 00:57:34.838 more question from the chat from

NOTE Confidence: 0.8419057

00:57:34.838 --> 00:57:37.304 someone in sports Medicine who has

NOTE Confidence: 0.8419057

00:57:37.304 --> 00:57:39.699 asked the following some power,

NOTE Confidence: 0.8419057

00:57:39.700 --> 00:57:41.384 five collegiate conferences and

NOTE Confidence: 0.8419057



00:57:41.384 --> 00:57:43.068 professional sports teams are  
NOTE Confidence: 0.8419057

00:57:43.068 --> 00:57:44.372 utilizing sensory deprivation  
NOTE Confidence: 0.8419057

00:57:44.372 --> 00:57:45.992 deprivation tanks to supplement  
NOTE Confidence: 0.8419057

00:57:45.992 --> 00:57:48.017 for individuals with sleep debt.  
NOTE Confidence: 0.8419057

00:57:48.020 --> 00:57:50.456 Are you familiar with any research  
NOTE Confidence: 0.8419057

00:57:50.456 --> 00:57:52.996 to validate their use as it  
NOTE Confidence: 0.8419057

00:57:52.996 --> 00:57:55.100 relates to performance? So I  
NOTE Confidence: 0.8419057

00:57:55.100 --> 00:57:56.772 have heard about this.  
NOTE Confidence: 0.8419057

00:57:56.772 --> 00:57:59.870 I've seen a couple of those tanks.  
NOTE Confidence: 0.8419057

00:57:59.870 --> 00:58:03.260 And I I don't know of  
NOTE Confidence: 0.8419057

00:58:03.260 --> 00:58:04.955 any empirical literature,  
NOTE Confidence: 0.8419057

00:58:04.960 --> 00:58:06.790 especially in athletes,  
NOTE Confidence: 0.8419057

00:58:06.790 --> 00:58:09.840 but even more generally among  
NOTE Confidence: 0.8419057

00:58:09.840 --> 00:58:12.712 non athletes samples that that  
NOTE Confidence: 0.8419057

00:58:12.712 --> 00:58:15.302 does relate to better sleep  
NOTE Confidence: 0.8419057

00:58:15.302 --> 00:58:17.540 and better performance.

NOTE Confidence: 0.8419057

00:58:17.540 --> 00:58:18.530 But I should say that.

NOTE Confidence: 0.8867025

00:58:20.650 --> 00:58:22.864 You know, like like a lot of other fields,

NOTE Confidence: 0.8867025

00:58:22.870 --> 00:58:24.940 but especially in athletic performance.

NOTE Confidence: 0.8867025

00:58:24.940 --> 00:58:27.990 What's being deployed in athletic

NOTE Confidence: 0.8867025

00:58:27.990 --> 00:58:31.521 performance circles oftentimes is is well

NOTE Confidence: 0.8867025

00:58:31.521 --> 00:58:34.657 ahead of what the research can be can

NOTE Confidence: 0.8867025

00:58:34.657 --> 00:58:38.187 be validating basically so oftentimes.

NOTE Confidence: 0.8867025

00:58:38.190 --> 00:58:40.002 You know the the researchers are

NOTE Confidence: 0.8867025

00:58:40.002 --> 00:58:41.948 playing catch up and talking to

NOTE Confidence: 0.8867025

00:58:41.948 --> 00:58:43.633 practitioners and saying what are

NOTE Confidence: 0.8867025

00:58:43.633 --> 00:58:45.898 you guys doing to optimize recovery?

NOTE Confidence: 0.8867025

00:58:45.900 --> 00:58:47.904 Or what are you guys doing

NOTE Confidence: 0.8867025

00:58:47.904 --> 00:58:48.906 with these athletes?

NOTE Confidence: 0.8867025

00:58:48.910 --> 00:58:50.842 And that's sometimes what Spurs the

NOTE Confidence: 0.8867025

00:58:50.842 --> 00:58:52.533 subsequent research that then either

NOTE Confidence: 0.8867025

00:58:52.533 --> 00:58:54.268 refutes or validates that approach.  
NOTE Confidence: 0.8867025

00:58:54.270 --> 00:58:56.718 So I wouldn't necessarily.  
NOTE Confidence: 0.8867025

00:58:56.720 --> 00:58:57.893 Say it's unfounded.  
NOTE Confidence: 0.8867025

00:58:57.893 --> 00:58:59.457 But the research doesn't  
NOTE Confidence: 0.8867025

00:58:59.457 --> 00:59:00.950 support it right now.  
NOTE Confidence: 0.881855399999999

00:59:01.960 --> 00:59:04.152 Great, thank you so much and I just  
NOTE Confidence: 0.881855399999999

00:59:04.152 --> 00:59:06.430 want to thank everybody for attending  
NOTE Confidence: 0.881855399999999

00:59:06.430 --> 00:59:08.505 the conference this semester and  
NOTE Confidence: 0.881855399999999

00:59:08.505 --> 00:59:10.995 we will see you all on January 6th  
NOTE Confidence: 0.881855399999999

00:59:10.995 --> 00:59:12.850 to resume for the next semester.  
NOTE Confidence: 0.881855399999999

00:59:12.850 --> 00:59:14.170 Thanks again, Doctor Klein.  
NOTE Confidence: 0.881855399999999

00:59:14.170 --> 00:59:15.820 Take care. Happy Holidays everybody.  
NOTE Confidence: 0.881855399999999

00:59:15.820 --> 00:59:16.810 Yeah. And if  
NOTE Confidence: 0.8818554

00:59:16.810 --> 00:59:18.790 anyone has any questions feel free  
NOTE Confidence: 0.8818554

00:59:18.790 --> 00:59:21.430 to email me. OK, thank you so much.