

Essay 1

John Andrus

The scholarly article “Long-Term Radiographic Adaptations to Stress of High-Level and Recreational Rock Climbing in Former Adolescent Athletes: An 11-Year Prospective Longitudinal Study” published in the Orthopedic Journal of Sports Medicine seeks to determine if intensive finger training by youth rock climbers leads to radiographic changes in finger joints later in life. The study uses observational data from 15 competitive and 13 casual rock climbers that have been involved in the sport from an early age and claims that intensive finger training can lead to early-onset osteoarthritis of the hand. However, several factors key to the design of the study may limit the strength of these claims.

For example, this study may overestimate the effect of finger training on early-onset osteoarthritis where in fact there could be little or no relationship. The study had a higher dropout rate for recreational climbers than for competitive climbers. It could be that less serious climbers are more likely to abandon the sport if they experience osteoarthritis related pain than competitive climbers who are more dedicated to the sport despite experiencing similar complications. While the competitive climbers were affiliated with the German Youth Team, the recreational climbers were most likely selected through their involvement with the German Alpine Club, who are a joint-venture to this study. These individuals who drop out of the sport likely would have ceased involvement with the club as well and, without up-to-date member information, would be harder to follow up with 11 years later. For former youth recreational climbers that the researchers *were* able to locate, those who dropped out years earlier due to injury may still be less likely to participate in the experiment. These factors could result in the competitive climbing group exhibiting a greater frequency of early-onset osteoarthritis, whereas if there was no dropout the groups might look quite similar.

The conclusions of this study also assumed that the effects of intense finger training on early-onset osteoarthritis could be determined by examining scans of a climber’s ring finger alone. According to the study, the experimenters decided to scan the climbers’ ring fingers because other research indicated that this was the most likely finger to be injured as a result of the sport. However, the assumption that dedicated finger training specifically leads to ring finger injuries is not substantiated in the paper. There may not necessarily be a link between dedicated finger training and ring finger injuries, nor necessarily a link between finger injuries and osteoarthritis. Knowing nothing of the subjects’ injury history, we could very well be observing the impact of injury on osteoarthritis formation, rather than training on osteoarthritis formation.

In contrast to an observational study, an experimental study might prove more effective at identifying what, if any, causal link there is between finger training and early-onset osteoarthritis. The experiment could consist of two randomized groups of teenagers with similar climbing

routines. The control group would follow a recreational climbing schedule, for example 2-3 sessions a week of moderate intensity. The recreational group would follow the same schedule, but with one of the weekly sessions consisting of a dedicated finger training regimen. Experimenters would observe the climbers completing these routines to prevent any issues with self-reporting and do so for several years, at least until the youth climbers had reached adulthood. Data would be collected on all five fingers for every participant with a zero percent dropout rate.

Naturally, an experiment of this nature would come with feasibility and ethics concerns. Intense dedicated finger training is at least anecdotally known to result in injury for youth climbers, and assigning such a regimen to an experimental group could result in long term health issues for the participants. Collecting full-hand data on numerous participants over multiple years would also be prohibitively expensive. There is also no way to guarantee a zero percent dropout rate, as there is likely no ethical way to require participants to continue climbing and participating in the study.

This study is truthfully quite well designed, with consideration given to ways that the methodology could be improved and factors that might have obscured the results. However, there is reason to believe that the high dropout rate could result in an overstatement of the relationship between finger training and osteoarthritis. Furthermore, the authors make key assumptions about the link between finger training, injury, and osteoarthritis that may not justify their claims without more detailed investigation of climbers' injury history. For these reasons, the claim that intensive finger training can lead to early-onset osteoarthritis of the hand is likely a step too far.

References

Schöffl, V. R., Hoffmann, P. M., Imhoff, A., Küpper, T., Schöffl, I., Hochholzer, T., & Hinterwimmer, S. (2018). Long-Term Radiographic Adaptations to Stress of High-Level and Recreational Rock Climbing in Former Adolescent Athletes: An 11-Year Prospective Longitudinal Study. *Orthopaedic journal of sports medicine*, 6(9), 2325967118792847. <https://doi.org/10.1177/2325967118792847>