## Further reading:

## Surfing injuries.

Although almost one third of surfers are suffering from an injury on a yearly basis, the evidence available regarding surfing injuries is scarce[1]. It is known that surfers spend 44-58% of their surf session paddling. Lying stationary accounts for 28–42% of the total time spent in the water, wave riding 4-8% and miscellaneous activities like duck-diving, wading and swimming takes 2–16%.[2]

At all aspects of surfing, injuries occur and most research is done at acute injuries, of which shoulder, knee and ankle are frequently reported. Recent studies showed that injuries acquired during paddling have a prevalence of 18% of the reported injuries in one year and that it accounts for 25% of all acute shoulder injuries.[1] [3] The growing popularity of the aerial maneuvers, might cause an increase of ankle and knee sprains.

To prevent injuries, it is important to analyze the sport specific load to the body too. The majority of the time the surfer is in the water, he or she is lying in prone position with hyper extension in the lumbar and cervical spine. Whilst paddling, the dominant movement of the shoulder is internal rotation, while pulling and pushing the body through the water.[4] Imbalanced training and overuse injuries might be the result and possibly contributes to the fact that many surfers suffer from injuries of the neck, lumbar spine and shoulder.[3][5][6][7][8][9]

In this training program, exercises not only focus on stretching, coordinative training, strength and stability, but also helps to train antagonist muscles that reduce muscular imbalance. If the surfer performs airs frequently, the (jumping) leg exercises may play a bigger role in the training. Endurance and breathing exercises are incorporated in the program to increase athletic performance and decrease the risk off drowning.

In this training program, exercises are focused at stretching, coordination, strength and stability of dominant muscle groups, as well as training antagonist muscles to reduce muscular imbalance.

## SMI surfing injury prevention training approach to scientific evidence.

The medical doctors of Surfing Medicine International (SMI) and their allied paramedical specialists share a passion for surfing, surf specific training, performance enhancement and injury prevention. With wave surfing becoming an Olympic sport, opportunities arise to improve the scientific research and expert based training methods which will help to develop this great sport even further for professional and amateur athletes. The allied paramedical specialists of the SMI have designed a training program which can be used to perform a thorough warm up before a surf session and exercises that will help to prevent injury and increase athletic performance.

The SMI aims to work as evidence based as possible. A database of internationally published surf related literature is well maintained, and new research is conducted by our own international crew of medical doctors, physical therapists and PhD or MSc students.

Studies on acute surf injuries and prevalence are more available than studies on chronic injuries due to overload. The available literature is incorporated in this exercise program and where evidence is inconclusive or not available, the expertise of our international crew with experience in training and treating surfers is added.

## Reference List:

- 1 Minghelli B, Nunes C, Oliveira R. Injuries in recreational and competitive surfers: a nationwide study in Portugal. J Sports Med Phys Fitness 2018;58. doi:10.23736/s0022-4707.17.07773-8
- 2 La Lanne CL, Cannady MS, Moon JF, et al. Characterization of activity and cardiovascular responses during surfing in recreational male surfers between the ages of 18 and 75 years old. J Aging Phys Act 2017;25:182–8. doi:10.1123/japa.2016-0041
- 3 Furness J, Hing W, Walsh J, et al. Acute injuries in recreational and competitive surfers: Incidence, severity, location, type, and mechanism. Am J Sports Med 2015;43:1246–54. doi:10.1177/0363546514567062
- 4 Carter J, Marshall N, Abbott A. Physical Therapy in Sport Shoulder pain and dysfunction in young surf lifesavers. *Phys Ther Sport* 2015;**16**:162–8. doi:10.1016/j.ptsp.2014.10.004
- 5 Jubbal KT, Chen C, Costantini T, *et al.* Analysis of surfing injuries presenting in the acute trauma setting. *Ann Plast Surg* 2017;**78**:S233–7. doi:10.1097/SAP.00000000001026
- 6 Klick C, Jones CMC, Adler D. Surfing USA: an epidemiological study of surfing injuries presenting to US EDs 2002 to 2013. Am J Emerg Med 2016;34:1491–6. doi:10.1016/j.ajem.2016.05.008
- 7 Nathanson A, Bird S, Dao L, *et al.* Competitive surfing injuries: A prospective study of surfing-related injuries among contest surfers. *Am J Sports Med* 2007;**35**:113–7. doi:10.1177/0363546506293702
- 8 Woodacre T, Waydia SE, Wienand-Barnett S. Aetiology of injuries and the need for protective equipment for surfers in the UK. *Injury* 2015;**46**:162–5. doi:10.1016/j.injury.2014.07.019
- 9 Nathanson AT. Surfing injuries. Adventure Extrem Sport Inj Epidemiol Treat Rehabil Prev 2002;:143–72. doi:10.1007/978-1-4471-4363-5\_7