

An Evidence-Based Perspective on Treating Severe Ankle Injuries

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Ankle injuries are very common but notoriously difficult to treat due to the complexity of the ankle anatomy, compounded by the range of surgical options available. Dr Markus Regauer, a leading orthopaedic surgeon from SportOrtho Rosenheim and Schön Klinik Vogtareuth, worked with a team of clinicians and scientists at the Musculoskeletal University Centre Munich to thoroughly review the published literature. This was combined with Dr Regauer's extensive surgical experience to produce a practical guide for surgeons to guide the best treatment for individual ankle (syndesmotic) injuries.

What is a Syndesmotic Injury?

In the USA, over 628,000 people seek medical care for ankle injuries yearly, and over 20% of all injury-related emergency department visits are for ankles. Ankle injuries are common in the general public as well as athletes, and can result in time away from work and leisure as well as increased risk of recurrent injury and long-term symptoms, including arthritis.

Syndesmotic injuries are damage to the ligaments that connect the two lower leg bones, the tibia and the fibula, located near the ankle. These injuries typically occur when the foot and ankle are forcefully twisted outwards away from the body, for example, during activities like football or skiing. Syndesmotic injuries make up to 20% of ankle sprains and about 30% of ankle fractures, and they are often more severe than other ankle injuries as they can leave the joint unstable and prone to further injury and the development of arthritis.

Challenges for Treatment

Syndesmotic injuries can be very complex, and despite their frequency and severity, there are no universally accepted treatment guidelines. Surgeons looking for the most effective treatment approach face considerable debate about what this might be.

One major point of contention is the choice between different surgical techniques. For instance, some surgeons prefer using rigid screws to hold the bones in place, while others advocate for dynamic fixation, which allows for more (physiological/natural) movement during recovery. Additionally, there's disagreement over whether to perform open surgery (where the area is fully exposed, allowing the surgeons to have a better view of and access to the area) or closed surgery (which is less invasive, reduces infection risk, and promotes quicker healing).

Despite evidence that using screws can lead to serious complications, many orthopaedic surgeons still see this method as the best option for treating these injuries. Besides the lower costs, this preference may stem from a few additional factors: some surgeons may not have received enough training in alternative methods, as well as a belief among many orthopaedic surgeons that using screws is a straightforward surgical technique.

Overall, the lack of clear consensus and ongoing debates reflect the complexities of treating syndesmotic injuries, making it essential for patients and medical professionals to stay informed about the latest research and best practices.

A Thorough Review of the Literature

To understand the best surgical treatment options for syndesmotic injuries, Dr Markus Regauer, a leading orthopaedic surgeon from Musculoskeletal University Centre Munich, and a dedicated team of clinicians and scientists conducted a thorough review of the published literature. The team aimed to determine the best surgical practices by analysing the evidence, focusing on which methods lead to better outcomes and fewer complications.

The team searched through four key medical literature databases for all papers covering the treatment of syndesmotic injuries. During the search, the team looked for evidence regarding seven different types of surgical interventions. These included: open versus closed surgeries, the use of special types of clamps to hold the bones during surgery, the role of screws, techniques allowing some movement at the affected joint, and the roles of key anatomical features such as certain ligaments and parts of the ankle bone.

Of the 1,271 articles which were identified, 171 met the study criteria and were thus included in the research. The team reviewed papers covering the individual interventions and trials directly comparing the patient outcomes of different methods.



What the Evidence Showed

Dr Regauer and the team's analysis highlighted several key principles for surgical treatment of unstable syndesmotic injuries, summarised as follows. It is essential to realign the bones properly because this is key to ensuring a successful recovery in the long run and preventing arthritis. When performing procedures, surgeons should use an open approach to see the injury directly. This visibility allows for better accuracy in repairs. Surgeons should focus on repairing all relevant injured parts to restore stability effectively.

If any bone pieces have broken off, they need to be located and repositioned correctly, as they help guide the overall alignment of the bones. Surgeons should avoid using clamps or tools that squeeze the bones together too tightly, as this can cause further complications. When fixing the posterior part of the tibia, it's best to do this directly from the back of the ankle whenever possible. In addition, surgeons should start by addressing the posterior part of the tibia first for anatomic alignment and better outcomes.

The anterior inferior tibiofibular (AITFL) ligament plays a crucial role in stabilising the ankle, especially when it comes to rotational movements. If this is unstable, it should be repaired and reinforced to maintain stability. Whenever possible, surgeons should use techniques that allow for some movement while still providing support, as this approach can lead to a more natural recovery. Syndesmotic screws should be considered a last resort, used only when other options are not effective.

An Evidence-based Surgical Treatment Algorithm

The article's most important contribution is its proposed surgical algorithm, based on the comprehensive literature review and Dr Regauer's extensive clinical career (during which he has performed hundreds of syndesmotic injury surgeries). This algorithm provides a step-by-step guide for surgeons, helping them choose the best surgical approach based on the specific characteristics of each injury. Fundamental to the algorithm is the importance of flexibility in surgical treatment. Each case is unique, and surgeons should consider the patient's specific injury, anatomy, and functional needs before deciding on the best treatment method.

As new technologies and techniques are developed, this algorithm may need to be updated. Ongoing research will be crucial in refining treatment methods and ensuring that patients with syndesmotic injuries receive the best possible care.



▲ Severe ankle dislocation fracture with syndesmotic injury (left) reduced and stabilized with flexible implants (right). Credit: Markus Regauer.



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MEET THE RESEARCHER

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Dr Markus Regauer is an orthopaedic and trauma surgeon currently working in private practice in Oberaudorf and Rosenheim and as a leading orthopaedic surgeon at Schön Klinik Vogtareuth in Germany. He has completed his medical education at Ludwig-Maximilians-University and Technical University in Munich. Until 2020, Dr Regauer was a senior consultant for orthopaedic and trauma surgery at Ludwig-Maximilians-University in Munich, where he led the Department of Foot and Ankle Surgery and organised several symposia and courses in the field. Dr Regauer has developed and published a new surgical technique for anatomic repair and augmentation of unstable syndesmotic injuries and is currently working on the development of new implants for ankle fractures in severe osteoporosis and for total talus replacement. Since 2011, he has been a member of the Editorial Board of the *World Journal of Orthopedics*, and since 2013, a paid consultant for Arthrex Inc. (Naples, USA). In May 2024, Dr Regauer became a member of the Internal Brace International Study Group (IBISG).

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Internal Brace International Study Group (IBISG)



FURTHER READING

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