Scaphoid nonunion: special edition

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I am very honored and proud to have been given the opportunity to edit this special edition dedicated to scaphoid nonunion treatment, particularly as this edition covers the wide range of operative procedures related to this problem and provides the best solutions for successful nonunion healing. I believe that this special edition will provoke immense academic interest among the readers and provide practical knowledge in operative treatment of scaphoid nonunion.

During my career in orthopedic surgery, patients with scaphoid bone fractures were always the most complex ones. Specific vascularization of scaphoid bone, its position, influence in wrist biomechanics and unpredictable course and results when healing were always a challenge. Over the years, scaphoid bone became a mystery and a difficulty for many orthopedic surgeons. New techniques in operative treatment surfaced, but the results were debatable. Some of the old approaches were redefined and modified. On the other hand, some new ones turned out to be ineffective, so the problem remained.

Over the years, different surgical solutions emerged. From simple nonunion sight debridement and fixations, bone graft osteoplasty vascularized bone grafts to new solutions that provide successful results even without nonunion sight opening. Now we know that the most efficient treatment is one that leads to fracture healing regardless of the technique used. Sometimes simple compression with different screws (Herbert screw, Acutrak

screw) or even K wires can lead to good results. Non-vascularized bone grafts in open reduction and screw fixation were used and still are the most popular procedure for nonunion treatment. Arthroscopic approach is frequently used nowadays with cancellous bone graft and percutaneous screw fixation [1–3]. More sophisticated technique with vascularized bone graft and open reduction and screw fixation seems to be the most efficient when the literature is consulted, but it can be technically demanding and only experienced and well-trained surgeons lead to accomplishment [4–6].

Ilizarov technique recently drew attention. This new technique has been used successfully in recalcitrant chronic long-bone nonunions and it can also be applied in this case. It is believed that bony healing is achieved through the application of compression and distraction at the fracture sites which is thought to improve local micro-circulation [7–9].

In relation to prognostic factors for successful treatment, some authors demonstrated connection between fracture localization and nonunion stability and therefore healing potential. If fracture line is located proximal to the apex of scaphoid, stability of fracture is good, and therefore, minimal mobility throughout the time does not lead to nonunion aggravation. These types of nonunion have better prognosis [10]. Also, delay between the initial trauma and the treatment of the established nonunion is significant factor that we have to consider. If time elapsed between trauma and treatment is five years or more, the possibility for healing is significantly lower [11–13].

Statistical analyses in some papers accentuate the following risk factors for failure: female gender, older age, tobacco use, proximal pole AVN, preoperative humpback deformity and non-screw fixation [14].

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Scaphoid nonunion can be sometimes asymptomatic; however, most patients eventually develop changes in the wrist with consequential pain and limited wrist function with a significant impact on their daily activities. Pain and loss of function are due to alterations in wrist biomechanics. Further more degenerative disease affects radial styloid area, the scaphoradial, scaphocapitate and capitolunate joints [15, 16]. Arthrosis is progressing over time and eventually leads to scaphoid nonunion advanced collapse (SNAC), dorsal intercalated segment instability with arthrosis in distal scaphoid fragment—radial styloid joint, progressing to the scaphocapitate and capitolunate joints [17–21].

As of recently, an accent is placed on stem cell therapy and biological treatment, but to date, only few papers dealing with this topic have been published [22, 23].

I hope that this special edition will be helpful for professionals who are dealing with this problem. We tried to elaborate the overall theme and to provide currently available solutions, in which, I believe, we succeeded.

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