

Fig. 3 Technique of internal fixation: **a)** the fracture on 3D CT reconstruction; **b)** intraoperative photograph after completion of internal fixation; **c)** postoperative 3D CT reconstruction.

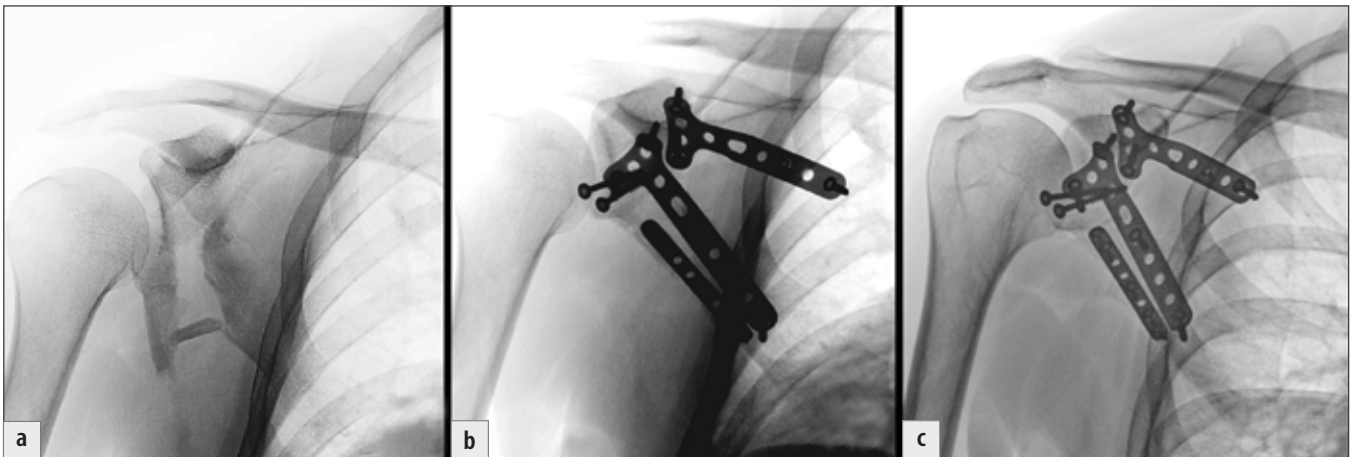


Fig. 4 Course of healing on radiographs: **a)** post-injury radiograph; **b)** postoperative radiograph; **c)** radiograph 10 years postoperatively, the fracture healed in an anatomical position.

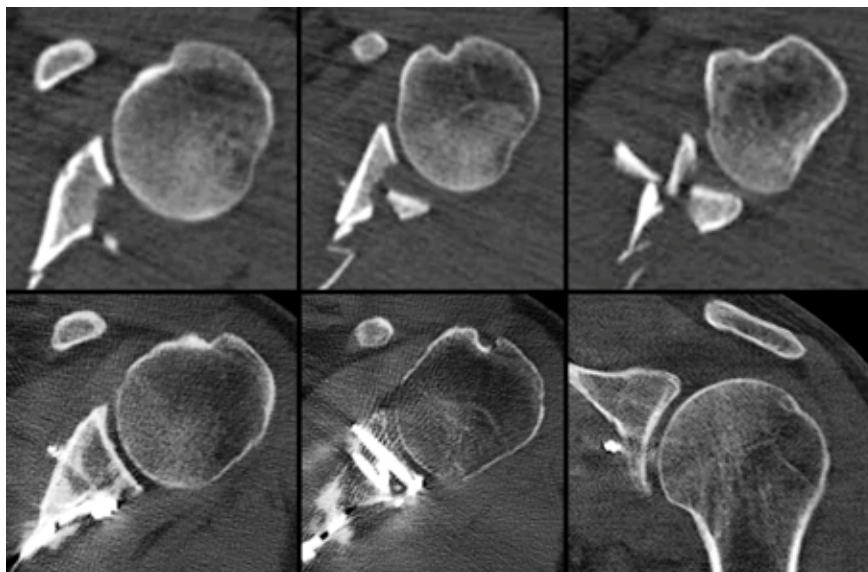


Fig. 5 Comparison of preoperative (top) and postoperative (bottom) 2D CT reconstructions.



Fig. 6 Functional outcome 3 months postoperatively.



Fig. 7 Functional outcome 7.5 years postoperatively.



Fig. 8 Comparison of pre- and postoperative 3D CT reconstructions 10 years after surgery.

SCAPULOTHORACIC DISSOCIATION (STD)

STD WITH FRACTURES OF THE ACROMION, THE LATERAL SPINE AND THE INFERIOR ANGLE

Patient: 39-year-old man

Mechanism of injury: fall from a motorcycle under crash barriers

Additional injuries: rupture of the subclavian vessels on the right side, fracture of the shaft of the radius and the ulna on the right side, fracture of the right femoral shaft, subtrochanteric fracture of the left femur

Result: the patient died from the injuries sustained

Note: After a fall from the motorcycle, the patient smashed through the crash barriers. His head, chest and abdomen remained intact. Although fractures of extremities dominated, the most severe were injuries to the subclavian vessels on the right side. Despite a prompt surgical revision of the subclavian artery, the patient died from uncontrolled bleeding. This case confirms that STD is frequently associated with a number of severe injuries and its prognosis is poor. In this case, the patient sustained a typical traction injury to the shoulder girdle; the scapular body, neck and glenoid remained intact.



Fig. 1 3D CT reconstructions of injuries to the forearm and both femurs.

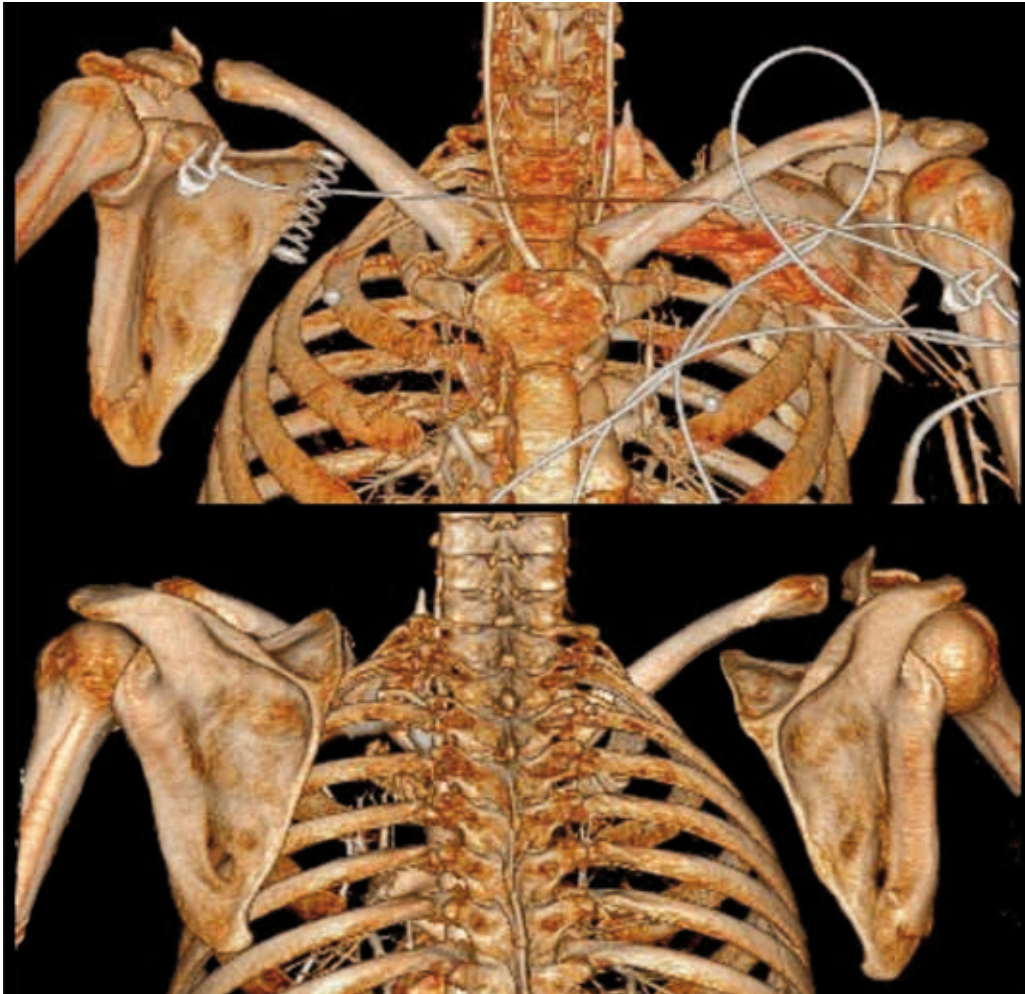


Fig. 2 STD on the right side on 3D reconstructions of both shoulder girdles.



Fig. 3 Fractures of the scapula on 3D CT reconstructions.

AUTHORS


Professor Jan Bartoníček, MD, DSc

Started his career in the Institute of Anatomy of 1st Faculty of Medicine, Charles University in Prague, and already dealt mainly with anatomy of limb joints during his undergraduate studies of medicine. After graduation from the university in 1980, he specialized in orthopaedics, where he could exploit his knowledge of anatomy. He focused on fractures of the proximal femur, the ankle and the scapula, foot surgery and the history of orthopaedic surgery. In 1992, he became Associate Professor and in 2004 Professor of Orthopaedics. Between 1993 and 2009 he held the post of head of the Department of Orthopaedics and Trauma Surgery of 3rd Faculty of Medicine, Charles University and University Hospital Královské Vinohrady in Prague. Since 2011 he has been head of Department of Orthopaedics of 1st Faculty of Medicine, Charles University, and the Central Military Hospital in Prague. In addition, he presents lectures on anatomy in the Institute of Anatomy of 1st Faculty of Medicine, Charles University, in Prague. To date he has published 4 textbooks, 16 chapters in textbooks, of these 10 publications in English, and 209 articles in journals. His major publication is the textbook on *Outlines of Clinical Anatomy of the Musculoskeletal Apparatus*. In 2002-2008, he was a Trustee in the AO-Foundation. He is a member of the Editorial Board of the Journal of Orthopaedic Trauma, International Orthopaedics, European Journal of Trauma and Emergency Surgery, Fuss und Sprunggelenk and JBJS Rev.


Professor Christopher Colton, MB, BS, LRCP, FRCS England, FRCS(Orth) Edinburgh

Qualified from St Thomas's Medical School in London in 1960. His orthopaedic career training saw him working at Royal National Orthopaedic Hospitals in London, where he rose to the positions of Senior Surgical Officer and University Lecturer. He was appointed as Consultant Orthopaedic and Trauma Surgeon at Nottingham University Hospital in 1973. He was awarded by the British Orthopaedic Association a prestigious ABC Travelling Fellowship in 1974, which gave him the opportunity to lecture and study at numerous American and Canadian university teaching hospitals. He has been awarded honorary membership of many national orthopaedic associations around the world. He was President of the British Orthopaedic Association in 1995-1996 and President of the AO Foundation 1996-1998. He has published over 70 peer-reviewed articles and book chapters, and has been a member of the editorial teams of the British Journal of Bone and Joint Surgery, Injury (International Journal of Accident Surgery), Journal of Orthopaedic Trauma, AO Dialogue and AO Surgery Reference.


Associate Professor Michal Tuček, MD, PhD

He began his medical career in 2006 at the Department of Orthopaedics and Traumatology of 3rd Faculty of Medicine, Charles University and University Hospital Královské Vinohrady in Prague. Since 2008 he has been working at the Department of Orthopaedics of 1st Faculty of Medicine, Charles University, and the Central Military Hospital in Prague. He deals primarily with surgery of the shoulder girdle, ankle fractures and sports injuries. In 2014, he earned a PhD degree and in 2017 was appointed Associate Professor in Orthopaedics; in both cases based on his theses dealing with scapular fractures. He is a co-author of 2 textbooks chapters, including one English publication, and has published 37 articles. In 2020, he was elected a member of the Board of the Czech Society for Orthopaedics and Trauma Surgery.


Associate Professor Ondřej Naňka, MD, PhD

He is a graduate from 1st Faculty of Medicine, Charles University, in Prague, where he also completed post-graduate studies in cell biology and pathology in 2005. He works in the Institute of Anatomy of 1st Faculty of Medicine, Charles University, in Prague. His scientific efforts are focused on molecular embryology in relation to development of the cardiovascular system under hypoxic conditions, as well as on clinical anatomy, of the musculoskeletal system in particular. He cooperates with a number of clinical departments within verification and development of new operative techniques and is involved in organization of clinical-anatomical symposia within post-graduate education. He also cooperates externally with the Department of Pediatric Surgery and Traumatology of 3rd Faculty of Medicine, Charles University, and the Thomayer Hospital in Prague. In 2010, he defended his thesis on the effect of hypoxia on the development of the embryonic vascular system. He is an author, or co-author, of 3 textbooks, 7 chapters in textbooks and multiple teaching texts dealing with anatomy, particularly a two-volume Atlas of Human Anatomy. He has published 83 articles. In 2007, he was awarded the Young Anatomist's Publication Award by the American Association of Anatomists. Since 1997 he has been a member and, since 2014, president of the Czech Anatomical Society.

AUTHORS' PUBLICATIONS ON SCAPULAR FRACTURES

This textbook has resulted from a systematic publication activity focused on scapular fractures, including 32 articles, and 7 chapters in the textbooks.

CHAPTERS IN TEXTBOOKS

1. **Bartoniček J.** Scapular fractures. In: Court-Brown CM, Heckman AD, McQueen M, Ricci WM, Tornetta P (eds). *Rockwood and Green's Fractures in Adults*. 8th edition. Philadelphia, Wolters Kluwer 2015: 1475-1501.
2. **Bartoniček J.** Scapular fractures. In: Court-Brown CM, McQueen M, Swiontkowski MF, Ring D, Friedman SM, Duckworth AD (eds). *Musculoskeletal Trauma in the Elderly*. Boca Raton, CRC Press Francis and Taylor 2016:231-248.
3. **Bartoniček J.** Appendix 1 – Research update. In: Vlček E. *Physical and personality traits of Charles IV, Holy Roman Emperor and King of Bohemia. A medical-anthropological investigation*. Praha, Karolinum 2016: 41-43.
4. **Bartoniček J.** Fractures of the scapula: International expert commentary. In: Rockwood C, Matsen FA, Wirth MA, Lippitt SB, Fehring EV, Sperling JW (eds). *The Shoulder*. 5th edition. Philadelphia, Elsevier 2017: 289-290.
5. **Bartoniček J.** Úskalí a komplikace při léčbě zlomenin lopatky [Problems and complications in the treatment of scapular fractures]. In: Wendsche P, Veselý R (eds). *Úskalí a komplikace při léčbě zlomenin [Problems and complications in the fracture treatment]*. Praha, Galén 2018: 70-76.
6. **Bartoniček J, Tuček M, Naňka M.** Scapular fractures. In: Trail IA, Funk L, Rangan A, Nixon M (eds). *Textbook of shoulder surgery*. Cham, Springer Nature 2019: 55-74.
7. **Bartoniček J.** Scapular fractures. In: Tornetta P, Ricci WM, Ostrum RF, McKee MD, McQueen M, Court-Brown CM (eds). *Rockwood and Green's Fractures in Adults*. 9th edition. Philadelphia, Wolters Kluwer 2020: 976-1008.

JOURNALS

1. **Bartoniček J, Tuček M, Luňáček L.** Judetův zadní přístup k lopatce [Judet posterior approach to the scapula]. *Acta Chir Orthop Traumatol Čech* 2008;75:429-435.
2. **Bartoniček J, Frič V, Tuček M.** Intra-operative reduction of the scapular body - A technical trick. *J Orthop Trauma* 2009;23:294-298.
3. **Bartoniček J, Frič V, Tuček M.** Radiodiagnostika zlomenin lopatky [Radiographic evaluation of scapula fractures]. *Rozhl Chir* 2009;88:84-88.
4. **Bartoniček J, Cronier P.** History of the treatment of scapula fractures. *Arch Orthop Trauma Surg* 2010;130:83-92.
5. **Bartoniček J, Frič V, Tuček M.** Zlomeniny lopatky: Diagnostika - klasifikace - terapie. [Scapula fractures. Diagnostics - classification - treatment]. *Ortopedie* 2010;4:151-156.
6. **Bartoniček J, Tuček M, Frič V.** Operační léčba zlomenin lopatky [Operative treatment of scapula fractures]. *Ortopedie* 2010;4:204-210.
7. **Bartoniček J, Frič V.** Scapular body fractures: Results of the operative treatment. *Int Orthop* 2011;35:747-753.
8. **Bartoniček J, Tuček M.** Historie léčby zlomenin lopatky [History of treatment of scapula fractures]. *Ortopedie* 2012;6:133-140.
9. **Bartoniček J, Tuček M, Frič V.** Fractures of the anatomical neck of the scapula: two cases and review of the literature. *Arch Orthop Trauma Surg* 2013;133:1115-1119.
10. **Bartoniček J, Tuček M, Frič V, P Obruba.** Fractures of the scapular neck: diagnosis-classification-treatment. *Int Orthop* 2014;38:2163-2173.
11. **Bartoniček J, Tuček M, Naňka O.** Zlomeniny lopatky [Scapular fractures]. *Rozhl Chir* 2015;94:393-404.
12. **Bartoniček J, Tuček M, Klika D, Chochola A.** Pathoanatomy and computed tomography classification of glenoid fossa fractures based on 90 patients. *Int Orthop* 2016;40:2383-2392.
13. **Bartoniček J, Kozánek M, Jupiter J.** Early history of scapular fractures. *Int Orthop* 2016;40:213-222.
14. **Bartoniček J, Tuček M, Klika D, Obruba P.** Total glenoid fractures. *Rozhl Chir* 2016;95:386-393.
15. **Bartoniček J, Tuček M, Klika D.** Inferior glenoid fossa fractures: pathoanatomy and results of operative treatment. *Int Orthop* 2017;41:1741-1747.
16. **Bartoniček J, Klika D, Tuček M.** Classification of scapular body fractures. *Rozhl Chir* 2018;97:67-76.
17. **Bartoniček J, Tuček M, Malík J.** Anatomie zlomenin dolního úhlu lopatky [Anatomy of fractures of the inferior scapular angle]. *Rozhl Chir* 2018;97:77-81.
18. **Bartoniček J, Tuček M, Naňka O.** Floating shoulder – myths or reality? *J Bone Joint Surg Rev* 2018;6/10:e5(1-10).
19. **Bartoniček J, Říha M, Tuček M.** Osteochondroma of scapular body – transscapular technique of resection: A case report. *J Shoulder Elbow Surg* 2018;27:e348-e353.
20. **Bartoniček J, Tuček M.** Infraglenoid fracture of the scapular neck – fact or myth? *Rozhl Chir* 2019;98:273-276.
21. **Bartoniček J, Tuček M, Strnad T, Naňka O.** Fractures of the coracoid process pathoanatomy and classification: Based on 39 cases with 3D CT reconstructions. *Inter Orthop* 2021;45:1009-1015.
22. **Bartoniček J, Naňka O.** History of diagnostics and treatment of scapular fractures in children and adolescents and its clinical importance. *Arch Orthop Trauma Surg* 2022;142:1067-1074.
23. **Chochola A, Tuček M, Klika D, Bartoniček J.** CT-diagnostika zlomeniny lopatky [CT-diagnostic of scapular fractures]. *Rozhl Chir* 2013;92:385-388.
24. **Naňka O, Bartoniček J, Havránek P.** Diagnosis and treatment of scapular fractures in children and adolescents: A critical analysis review. *JBJS Rev* 2022 Feb 15;10(2).
25. **Strnad T, Bartoniček J, Tuček M, Naňka O.** The coracoglenoid notch – anatomy and clinical significance. *Surg Radiol Anat* 2021;43:11-17.
26. **Strnad T, Bartoniček J, Tuček M, Naňka O.** Circumflex arterial sulcus of the scapula (Sulcus arteriae circumflexae scapulae). Its anatomy and clinical relevance. *Surg Radiol Anat* online.
27. **Tuček M, Bartoniček J.** Přidružená poranění u zlomenin lopatky [Associated injuries of the scapula fractures]. *Rozhl Chir* 2010;89:288-292.
28. **Tuček M, Bartoniček J, Frič V.** Kostní anatomie lopatky: Její význam pro klasifikaci zlomenin těla lopatky [Osseous anatomy of scapula: Its importance for classification of scapular body fractures]. *Ortopedie* 2011;5:104-109.
29. **Tuček M, Bartoniček J, Novotný P, Voldřich M.** Bilateral scapular fractures in adults. *Int Orthop* 2013;37:659-665.
30. **Tuček M, Naňka O, Malík J, Bartoniček J.** The scapular glenopolar angle: standard values and side differences. *Skeletal Radiol* 2014;43:1583-1587.
31. **Tuček M, Chochola A, Klika D, Bartoniček J.** Epidemiology of scapular fractures. *Acta Orthop Belg* 2017;83:8-15.
32. **Tuček M, Strnad T, Obruba P, Bartoniček J.** Fractures of the surgical neck of the scapula with separation of the coracoid base. *Rozhl Chir* 2020;99:368-372.