

S2 Appendix.

Publications included in a HTA analysis of humerus fractures, performed by the Swedish Agency for Health Technology Assessment and Assessment of Social Services

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Included publications – Effectiveness and complications of treatments

Randomized controlled trials (18 trials)

1. Agorastides, I., C. Sinopidis, M. El Meligy, Q. Yin, P. Brownson and S. P. Frostick (2007). "Early versus late mobilization after hemiarthroplasty for proximal humeral fractures." *J Shoulder Elbow Surg* 16(3 Suppl): S33-38.
2. Boons, H. W., J. H. Goosen, S. van Grinsven, J. L. van Susante and C. J. van Loon (2012). "Hemiarthroplasty for humeral four-part fractures for patients 65 years and older: a randomized controlled trial." *Clin Orthop Relat Res* 470(12): 3483-3491.
3. Buecking, B., J. Mohr, B. Bockmann, R. Zettl and S. Ruchholtz (2014). "Deltoid-split or deltopectoral approaches for the treatment of displaced proximal humeral fractures?" *Clin Orthop Relat Res* 472(5): 1576-1585.
4. Chen, H., X. Ji, Y. Gao, L. Zhang, Q. Zhang, X. Liang and P. Tang (2016). "Comparison of intramedullary fibular allograft with locking compression plate versus shoulder hemi-arthroplasty for repair of osteoporotic four-part proximal humerus fracture: Consecutive, prospective, controlled, and comparative study." *Orthop Traumatol Surg Res* 102(3): 287-292.

5. Fialka, C., P. Stampfl, S. Arbes, P. Reuter, G. Oberleitner and V. Vecsei (2008). "Primary hemiarthroplasty in four-part fractures of the proximal humerus: randomized trial of two different implant systems." *J Shoulder Elbow Surg* 17(2): 210-215.
6. Fjalestad, T. and M. O. Hole (2014). "Displaced proximal humeral fractures: operative versus non-operative treatment--a 2-year extension of a randomized controlled trial." *Eur J Orthop Surg Traumatol* 24(7): 1067-1073.
7. Fjalestad, T., M. O. Hole, I. A. Hovden, J. Blucher and K. Stromsoe (2012). "Surgical treatment with an angular stable plate for complex displaced proximal humeral fractures in elderly patients: a randomized controlled trial." *J Orthop Trauma* 26(2): 98-106.
8. Gracitelli, M. E., E. A. Malavolta, J. H. Assuncao, K. E. Kojima, P. R. Dos Reis, J. S. Silva, A. A. Ferreira Neto and A. J. Hernandez (2016). "Locking intramedullary nails compared with locking plates for two- and three-part proximal humeral surgical neck fractures: a randomized controlled trial." *J Shoulder Elbow Surg* 25(5): 695-703.
9. Handoll, H., S. Brealey, A. Rangan, A. Keding, B. Corbacho, L. Jefferson, L. H. Chuang, L. Goodchild, C. Hewitt and D. Torgerson (2015). "The ProFHer (PROximal fracture of the humerus: Evaluation by randomisation) trial – A pragmatic multicentre randomized controlled trial evaluating the clinical effectiveness and cost-effectiveness of surgical compared with non-surgical treatment for proximal fracture of the humerus in adults." *Health Technology Assessment* 19(24): 1-279.
10. Liu, Z. Z., G. M. Zhang and T. Ge (2011). "Use of a proximal humeral internal locking system enhanced by injectable graft for minimally invasive treatment of osteoporotic proximal humeral fractures in elderly patients." *Orthop Surg* 3(4): 253-258.
11. Lopiz, Y., J. Garcia-Coiradas, C. Garcia-Fernandez and F. Marco (2014). "Proximal humerus nailing: a randomized clinical trial between curvilinear and straight nails." *J Shoulder Elbow Surg* 23(3): 369-376.
12. McKee, M. D., C. J. Veillette, J. A. Hall, E. H. Schemitsch, L. M. Wild, R. McCormack, B. Perey, T. Goetz, M. Zomar, K. Moon, S.

Mandel, S. Petit, P. Guy and I. Leung (2009). "A multicenter, prospective, randomized, controlled trial of open reduction--internal fixation versus total elbow arthroplasty for displaced intra-articular distal humeral fractures in elderly patients." *J Shoulder Elbow Surg* 18(1): 3-12.

13. Olerud, P., L. Ahrengart, S. Ponzer, J. Saving and J. Tidermark (2011). "Hemiarthroplasty versus nonoperative treatment of displaced 4-part proximal humeral fractures in elderly patients: a randomized controlled trial." *J Shoulder Elbow Surg* 20(7): 1025-1033.
14. Olerud, P., L. Ahrengart, S. Ponzer, J. Saving and J. Tidermark (2011). "Internal fixation versus nonoperative treatment of displaced 3-part proximal humeral fractures in elderly patients: a randomized controlled trial." *J Shoulder Elbow Surg* 20(5): 747-755.
15. Sebastia-Forcada, E., R. Cebrian-Gomez, A. Lizaur-Utrilla and V. Gil-Guillen (2014). "Reverse shoulder arthroplasty versus hemiarthroplasty for acute proximal humeral fractures. A blinded, randomized, controlled, prospective study." *J Shoulder Elbow Surg*.
16. Voigt, C., A. Geisler, P. Hepp, A. P. Schulz and H. Lill (2011). "Are polyaxially locked screws advantageous in the plate osteosynthesis of proximal humeral fractures in the elderly? A prospective randomized clinical observational study." *J Orthop Trauma* 25(10): 596-602.
17. Zhang, L., J. Zheng, W. Wang, G. Lin, Y. Huang, J. Zheng, G. A. Edem Prince and G. Yang (2011). "The clinical benefit of medial support screws in locking plating of proximal humerus fractures: a prospective randomized study." *Int Orthop* 35(11): 1655-1661.
18. Zyto, K., L. Ahrengart, A. Sperber and H. Tornkvist (1997). "Treatment of displaced proximal humeral fractures in elderly patients." *J Bone Joint Surg Br* 79(3): 412-417.

Non-randomized control trials (21 trials)

1. Boyle, M. J., S. M. Youn, C. M. Frampton and C. M. Ball (2013). "Functional outcomes of reverse shoulder arthroplasty compared

with hemiarthroplasty for acute proximal humeral fractures." *J Shoulder Elbow Surg* 22(1): 32-37.

2. Chen, F., Z. Wang and T. Bhattacharyya (2013). "Outcomes of nails versus plates for humeral shaft fractures: a Medicare cohort study." *J Orthop Trauma* 27(2): 68-72.
3. Cuff, D. J. and D. R. Pupello (2013). "Comparison of hemiarthroplasty and reverse shoulder arthroplasty for the treatment of proximal humeral fractures in elderly patients." *J Bone Joint Surg Am* 95(22): 2050-2055.
4. Dietz, S. O., P. Broos, S. Nijs, A. (2012). "Suture fixation versus cable cerclage of the tuberosities in shoulder arthroplasty-clinical and radiologic results." *Archives of Orthopaedic and Trauma Surgery* 132(6): 793-800.
5. Gallinet, D., P. Clappaz, P. Garbuio, Y. Tropet and L. Obert (2009). "Three or four parts complex proximal humerus fractures: hemiarthroplasty versus reverse prosthesis: a comparative study of 40 cases." *Orthop Traumatol Surg Res* 95(1): 48-55.
6. Gradl, G., A. Dietze, M. Kaab, W. Hopfenmuller and T. Mittlmeier (2009). "Is locking nailing of humeral head fractures superior to locking plate fixation?" *Clin Orthop Relat Res* 467(11): 2986-2993.
7. Hauschild, O., G. Konrad, L. Audige, P. de Boer, S. M. Lambert, R. Hertel and N. P. Sudkamp (2013). "Operative versus non-operative treatment for two-part surgical neck fractures of the proximal humerus." *Arch Orthop Trauma Surg* 133(10): 1385-1393.
8. Innocenti, M., C. Carulli, R. Civinini, F. Matassi, M. Tani, F. Muncibi, A. (2013). "Displaced fragility fractures of proximal humerus in elderly patients affected by severe comorbidities: Percutaneous fixation and conservative treatment." *Aging Clinical and Experimental Research* 25(4): 447-452.
9. Konrad, G., L. Audige, S. Lambert, R. Hertel and N. P. Sudkamp (2012). "Similar outcomes for nail versus plate fixation of three-part proximal humeral fractures." *Clin Orthop Relat Res* 470(2): 602-609.

10. Konrad, G., A. Hirschmuller, L. Audige, S. Lambert, R. Hertel and N. P. Sudkamp (2012). "Comparison of two different locking plates for two-, three- and four-part proximal humeral fractures-- results of an international multicentre study." *Int Orthop* 36(5): 1051-1058.
11. Loew, M., S. Heitkemper, D. Parsch, S. Schneider and M. Rickert (2006). "Influence of the design of the prosthesis on the outcome after hemiarthroplasty of the shoulder in displaced fractures of the head of the humerus." *J Bone Joint Surg Br* 88(3): 345-350.
12. Ortmaier, R., V. Filzmaier, W. Hitzl, R. Bogner, T. Neubauer, H. Resch and A. Auffarth (2015). "Comparison between minimally invasive, percutaneous osteosynthesis and locking plate osteosynthesis in 3-and 4-part proximal humerus fractures." *BMC Musculoskelet Disord* 16: 297.
13. Ortmaier, R., G. Mattiassich, M. Pumberger, W. Hitzl, P. Moroder, A. Auffarth and H. Resch (2015). "Comparison between reverse shoulder arthroplasty and Humerusblock in three- and four-part proximal humerus fractures in elderly patients." *Int Orthop* 39(2): 335-342.
14. Peng, C. H., W. T. Wu, T. C. Yu, L. C. Chen, S. H. Hsu, S. T. Kwong, T. K. Yao, K. C. Wu, P. C. Shao, J. H. Wang and I. H. Chen (2012). "Surgical treatment for proximal humeral fracture in elderly patients with emphasis on the use of intramedullary strut allografts." *Tzu Chi Medical Journal* 24(3): 131-135.
15. Prasad, N. and C. Dent (2008). "Outcome of total elbow replacement for distal humeral fractures in the elderly: a comparison of primary surgery and surgery after failed internal fixation or conservative treatment." *J Bone Joint Surg Br* 90(3): 343-348.
16. Schai, P., A. Imhoff and S. Preiss (1995). "Comminuted humeral head fractures: a multicenter analysis." *J Shoulder Elbow Surg* 4(5): 319-330.
17. Shi, H. F., J. Xiong, Y. X. Chen, J. F. Wang, S. F. Wang, Z. J. Chen and Y. Qiu (2011). "Management of proximal humeral fractures in elderly patients with uni- or polyaxial locking osteosynthesis system." *Arch Orthop Trauma Surg* 131(4): 541-547.

18. Spross, C., A. Platz, M. Erschbamer, T. Lattmann and M. Dietrich (2012). "Surgical treatment of Neer Group VI proximal humeral fractures: retrospective comparison of PHILOS(R) and hemiarthroplasty." *Clin Orthop Relat Res* 470(7): 2035-2042.
19. Urda, A., A. Gonzalez, A. Colino, Y. Lopiz, C. Garcia-Fernandez and F. Marco (2012). "Management of displaced surgical neck fractures of the humerus: health related quality of life, functional and radiographic results." *Injury* 43 Suppl 2: S12-19.
20. Wu, X., S. H. Li, Z. D. Cai and L. M. Lou (2013). "Modified hemiarthroplasty for four-part fractures of the proximal humerus." *ANZ J Surg* 83(3): 165-170.
21. Yan, D., Y. Soon, A. Author, N. P. (2012). "Comparative study of T-plates and locking plates in the management of displaced proximal humeral fractures." *Current Orthopaedic Practice* 23(4): 351-355.

Included publications – health economic evaluations

1. Corbacho, B., A. Duarte, A. Keding, H. Handoll, L. H. Chuang, D. Torgerson, S. Brealey, L. Jefferson, C. Hewitt, A. Rangan, A. (2016) "Cost effectiveness of surgical versus nonsurgical treatment of adults with displaced fractures of the proximal humerus: Economic evaluation alongside the propher trial." *Bone and Joint Journal* 98B (2): 152-159.
2. Fjalestad, T., M. O. Hole, J. J. Jorgensen, K. Stromsoe and I. S. Kristiansen (2010). "Health and cost consequences of surgical versus conservative treatment for a comminuted proximal humeral fracture in elderly patients." *Injury* 41(6): 599-605.
3. Nwachukwu BU, Schairer WW, McCormick F, Dines DM, Craig EV, Gulotta LV, (2016). "Arthroplasty for the surgical management of complex proximal humerus fractures in the elderly: A cost-utility analysis. *Journal of Shoulder and Elbow Surgery.*";25(5):704-13.