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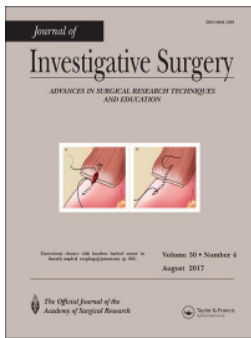
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## Supracondylar Humerus Fractures in Infants and Toddlers: An Unexplored Area

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This write-up refers to the article ‘Supracondylar Humerus Fractures in Infants and Early Toddlers: Characteristics, Clinical and Radiological Outcomes Compared With Older Children’.

Supracondylar humeral fractures are the most common fracture around the elbow in children [1–3]. Up to 17% of all limb fractures in children are supracondylar humeral fractures [2]. Due to its common prevalence, it is imperative for both pediatric and general orthopedic surgeons to master the technique of treatment for supracondylar humeral fractures [4–6]. Generally, the treatment of supracondylar humeral fractures is based on the degree of displacement, firstly described by Gartland back in the year 1959 and subsequently modified by Wilkins in 1984 [7]. An undisplaced supracondylar humeral fracture is classified as Gartland type I and is commonly treated conservatively via close manipulative reduction and casting [7]. A partially displaced supracondylar humeral fracture with intact posterior cortex is graded as Gartland type II [7]. Although there are some contentions regarding the optimal treatment of Gartland II supracondylar humeral fractures, but the trend is moving toward stabilization with pinning [7]. Gartland III supracondylar humeral fracture, a severely displaced fracture without any cortical contact, requires surgical manipulation and stabilization with implants [7]. There are different fixation methods such as lateral convergent Kirschner wires, cross Kirschner wires or lateral external fixation with each having its pros and cons [1–7].

Although supracondylar humeral fractures have a peak incidence between the age of 5 and 7 years, it can be seen in newborns and children up to 14 years old, albeit with a different etiology [1–3]. Supracondylar humeral fractures have been extensively researched, ranging from the etiology, treatment options, associated neurovascular injury and their functional outcomes [1–7]. Nevertheless, information on supracondylar humeral fractures in infants and toddlers is scarce. Thus far, only Striano et al investigated the outcomes of supracondylar humeral fractures in toddlers and compared them with older children [8]. They observed that toddlers tend to sustain the injury at home, to be the result of suspected non-accidental injury, and tend to have more severe varus deformity or recurrent displacement after reduction [8]. In this aspect, Akgülle AH have provided an

additional insight into the characteristics, clinical and radiological outcomes of supracondylar humeral fractures in infants and toddlers [3]. By definition, children aged less than 1 year are considered infants and toddlers if the age is between 1 and 3 years [9]. Nevertheless, Akgülle AH have chosen a cutoff age of 30-month-old to delineate toddlers and older children, owing to the fact that gross motor skill development reaches a plateau at 30 months old [3]. Similar to previous studies by Striano et al, this study also demonstrates that younger children have higher degree of cubital varus but their functional outcomes are not compromised, suggesting soft-tissue compensation is well beyond bony remodeling [3, 8]. With this fact in mind, treating surgeons need to beware of the risk of inadequate coronal plane reduction that will lead to varus deformity. On the other hand, operating surgeons do not need to forcefully correct the varus deformity to the point of causing excessive soft tissue and skin injuries, as the deformity is well-tolerated at this age group.

Despite this article contributes extensively on the vacuum of literature in supracondylar humeral fractures in younger children, it is important to bear in mind that supracondylar humeral fractures in toddlers and infants are generally low-energy in mechanism and hence they normally present with less displacement and are usually treated conservatively. Thus far, radiological and functional outcomes of conservative treatment of supracondylar humeral fractures in infants and toddlers are still yet to be explored. Future studies focusing on both conservative and operative management of supracondylar humeral fractures in toddlers and infants will shed more light on this unexplored aspect of supracondylar humeral fractures. In the same vein, due to a huge discrepancy between the age of infant and toddler, the size of Kirschner wires used in this population also varies markedly. A study by Gottschalk et al concluded that a larger Kirschner wire significantly increases fracture stability while increasing the number of Kirschner wires from two to three does not improve the construct stability [10]. Whether the size and number of the Kirschner wires utilized in stabilizing the supracondylar humeral fractures in infants and toddlers are the factors that lead to loss of reduction and subsequently varus deformity remain to be explored.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## References

1. Hubbard EW, Riccio AI. Pediatric orthopedic trauma: An evidence-based approach. *Orthop Clin North Am.* 2018;49(2):195–210. doi:10.1016/j.ocl.2017.11.008.
2. Kow RY, Zamri AR, Ruben JK, Jamaluddin S, Mohd-Nazir MT. Humeral supracondylar fractures in children: A novel technique of lateral external fixation and kirschner wiring. *Malays Orthop J.* 2016;10(2):41–46. doi:10.5704/MOJ.1607.008.
3. Akgülle AH, Şahbat Y, Baysal Ö, Kart H, Erol B. Supracondylar humerus fractures in infants and early toddlers: Characteristics, clinical and radiological outcomes compared with older children. *J Invest Surg.* 2022;35(11–12):1797–1805. doi:10.1080/08941939.2022.2123577.
4. Abzug JM, Herman MJ. Management of supracondylar humerus fractures in children: Current concepts. *J Am Acad Orthop Surg.* 2012;20(2):69–77. doi:10.5435/JAAOS-20-02-069.
5. Kropelnicki A, Ali AM, Papat R, Sarraf KM. Paediatric supracondylar humerus fractures. *Br J Hosp Med (Lond).* 2019;80(6):312–316. doi:10.12968/hmed.2019.80.6.312.
6. Aydin M, Surucu S. Supracondylar humerus fractures in children caused by monkey bar-related injuries: A comparative study. *J Pediatr Orthop B.* 2022. doi:10.1097/BPB.0000000000000980.
7. Shah M, Agashe MV. Supracondylar humerus fractures: Classification based treatment algorithms. *Indian J Orthop.* 2021;55(1):68–80. doi:10.1007/s43465-020-00285-2.
8. Striano BM, De Mattos C, Ramski DE, Flynn KR, Horn BD. Displaced supracondylar humerus fractures in toddlers. *Orthopedics.* 2020;43(5):e421–4. doi:10.3928/01477447-20200619-13.
9. Kemp AM, Dunstan F, Harrison S, et al. Patterns of skeletal fractures in child abuse: Systematic review. *BMJ.* 2008;337:a1518. doi:10.1136/bmj.a1518.
10. Gottschalk HP, Sagoo D, Glaser D, Doan J, Edmonds EW, Schlechter J. Biomechanical analysis of pin placement for pediatric supracondylar humerus fractures: Does starting point, pin size, and number matter? *J Pediatr Orthop.* 2012;32(5):445–451. doi:10.1097/BPO.0b013e318257d1cd.