

ROUND 1 & 2

AUTHOR RESPONSES TO REFEREE REMARKS

Derotational osteotomy and internal fixation of a 180° malrotated humerus: a case report and review of the literature

Reviewer Remarks	Authors' Responses	Text Changes
Reviewer #1		
Abstract Background Line 2 severe rotation deformity of the humerus is extreme rare (Extremely)	We made the requested change.	P2L6: Extremely
Introduction The corrections in the response letter are missing in the manuscript	The introduction was edited.	
Case presentation History Need to be re-phrased to be less confusing Discussion the Ilizarov external fixator and Taylor-Spatial-Frame still seem to be the mainstay of treatment (21)(10)(22) The used 3 citations are not enough to conclude such information, the supplied references 20-21 are irrelevant and need to be either changed or removed I think the evidence on the rule of a single-stage exchange plating in osteosynthesis-related infection is needed to support the management of this case, this point needs to be elaborated in the discussion section on the expense of radial nerve palsy which could be summarized more.	We made changes.	P3L13-18: In 2009, the patient, a right hand-dominant adolescent female, had sustained a traumatic left humeral shaft fracture that was treated nonoperatively. In 2019, at age 27, the patient was referred to our institution with severe malrotation of her left humerus associated with shortening of the upper arm and limited ROM of the shoulder and elbow. The patient complained of consistent pain that increased during activities and severe limitations of activities related to daily living. Furthermore, she described the cosmetic deformity as being repulsive to herself.
Discussion the Ilizarov external fixator and Taylor-Spatial-Frame still seem to be the mainstay of treatment (21)(10)(22) The used 3 citations are not enough to conclude such	The citations were "Humeral lengthening and deformity correction with the multiaxial correction system." and "Ilizarov principles of deformity correction." Nevertheless, they were	P 7 L1-6: " Bulky techniques, like Ilizarov external fixation or Taylor-Spatial-Frame, are still practiced and offered as reliable treatment options ¹¹¹² . For upper limb treatment, circular

information, the supplied references 20-21 are irrelevant and need to be either changed or removed.	removed. The discussion was changed.	fixation techniques like the Ilizarov external fixator and Taylor-Spatial-Frame pose problems of discomfort because of the limited distance to the thorax. Additionally, proximal or midshaft humeral fractures provide only limited bone stock for proximal fixation for all external fixation systems.
I think the evidence on the rule of a single-stage exchange plating in osteosynthesis-related infection is needed to support the management of this case, this point needs to be elaborated in the discussion section on the expense of radial nerve palsy which could be summarized more.	We added a paragraph regarding infection treatment.	P8L9-18: Different treatment options for surgical site infections and infected nonunions during a single or staged procedure have been discussed ^{22,23} . Due to the fact that our patient presented with infection 4 months postoperatively, nonunion with secondary infection was assumed. Wu et al. ²⁴ reported a preference for single-stage treatment to address infected nonunions with Ilizarov fixation. Since our patient was healthy without comorbidities, we respected her request to continue with the initial therapy in order to avoid external fixation or recurrence of the deformity. Therefore, thorough debridement and hardware exchange were performed as a single-stage revision. Olszewski et al. ²² reported their support of such an approach, based upon their data showing that 78% of patients healed after an index procedure and were able to avoid external fixation.
The reference was updated and written in a good style and sufficient Language quality needs some polishing	Thank you!	No changes.
Language quality needs some polishing		Manuscript was sent to a professional English language company. The company provide a new language certificate.
Reviewer #2:		
The title reflects the main subject of the manuscript in a concise way.	Thank you	No changes.
The abstract shouldn't contain citations as	We agree with that and have used the desired	Citations were erased.

done in P1, line 28 Page 1, line 27& 28 (severe rotation deformity of the humerus is extremely rare) (only three cases have been reported)	format.	
Keywords reflect the focus of the manuscript	Thank you!	No changes.
Background: Succinct with no knowledge gap and didn't show the problem	Thank you. We made changes.	Page 2 L5-8: Humeral shaft fractures are relatively common in adults. Rotational malalignment is reported as one complication, but severe rotational deformity of the humerus is extremely rare. To our knowledge, only three cases of symptomatic humeral malrotation have been reported. There are sparse literature reports of humeral reconstruction correction.
Page 2, line 25, referring to the old accident place was not appropriate and does not make any difference to the reader	We agree with that. Changes made.	Page 3 L13-18: In 2009, the patient, a right hand-dominant adolescent female, had sustained a traumatic left humeral shaft fracture that was treated nonoperatively. In 2019, at age 27, the patient was referred to our institution with severe malrotation of her left humerus associated with shortening of the upper arm and limited ROM of the shoulder and elbow. The patient complained of consistent pain that increased during activities and severe limitations of activities related to daily living. Furthermore, she described the cosmetic deformity as being repulsive to herself.
Page 3, line 2, the word urgently cannot be compliant with trauma for 10 years	We agree with that We made changes.	Page 3 L16-18: The patient complained of consistent pain that increased during activities and severe limitations of activities related to daily living. Furthermore, she described the cosmetic deformity as being repulsive to herself.
Page 3, line 24 (The radial nerve was exposed to avoid damage due to the severe derotation), to which level? did the exploration extend to the lateral intermuscular septum? how was it	Changes made.	Page 4 L10-16 The surgical procedure was performed with the patient in the supine position, under brachial plexus blocking and general anesthesia. The proximal humerus

<p>done for the posterior compartment while the approach was the extended deltopectoral approach?</p>		<p>and humeral shaft were exposed through a deltopectoral approach with distal anterior extension following the anatomic muscles of the upper arm. Through the same anterior extensile incision, the radial nerve was exposed and released from the posterior aspect of the deltoid through the lateral intermuscular septum to the distal arm, in order not to lessen tension during the humeral derotation.</p>
<p>P5, line 17 (Ilizarov external fixator and Taylor-Spatial-Frame still seem to be the mainstay of treatment), this phrase was not confirmed, even the supplied reference couldn't conclude this, one of them is about (humeral lengthening in non-traumatic cases) and the other is a classic book about deformity correction, no evidence to support this in literature.</p>	<p>Thank you. We added a recent publication in the World Journal of Orthopedics regarding the Ilizarov technique for bone reconstruction.</p> <p>We also made changes.</p>	<p>Page 6 L24-26 + Page 7 L1-6: In contrast, deformity correction and bone lengthening of the lower extremities are standard techniques, with an increasing number of reports appearing in the literature. External fixators (unilateral, multiaxial, or circular) are utilized. Bulky techniques, like Ilizarov external fixation or Taylor-Spatial-Frame, are still practiced and offered as reliable treatment options^{11,12}. For upper limb treatment, circular fixation techniques like the Ilizarov external fixator and Taylor-Spatial-Frame pose problems of discomfort because of the limited distance to the thorax. Additionally, proximal or midshaft humeral fractures provide only limited bone stock for proximal fixation for all external fixation systems.</p>
<p>P6, line 23, reference is not correct, please revise</p>	<p>We have revised the reference.</p>	<p>Page 8 L19: Bae et al. (...)</p>
<p>The infection has been treated by one-stage revision plate osteosynthesis. this point needs to be discussed with supplied evidence as it is not the routine method of treatment of infection related to osteosynthesis.</p>	<p>Thank you. We made changes.</p>	<p>Page 8 L9 -18: Different treatment options for surgical site infections and infected nonunions during a single or staged procedure have been discussed^{22,23}. Due to the fact that our patient presented with infection 4 months postoperatively, nonunion with secondary infection was assumed. Wu et al.²⁴ reported a preference for single-stage treatment to address infected nonunions with Ilizarov fixation. Since our patient was healthy without comorbidities, we respected her request to</p>

		continue with the initial therapy in order to avoid external fixation or recurrence of the deformity. Therefore, thorough debridement and hardware exchange were performed as a single-stage revision. Olszewski et al. ²² reported their support of such an approach, based upon their data showing that 78% of patients healed after an index procedure and were able to avoid external fixation.
The improvement of the shoulder Range of motion was not explained.	Thank you. Improved ranges of motion reviewed.	Page 6 L9-11: Compared to preoperative function, she demonstrated a marked improvement in all areas of arm motion. She did not have full shoulder ROM secondary to the preoperative, degenerative changes of her left shoulder (<i>Figure 7a-c</i>). Page 6 L14-17: The patient completed the follow-up Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire and we were able to make a direct comparison of her pre- and postoperative scores, which indicated an improvement from 55 (preoperatively) to 16 (at the final follow-up).
Illustrations and tables: Fine	Thank you.	No changes.
Reference styling is not the same and needs to be re-written	Thank you.	Changes made.
Language Quality Grade C		Manuscript was sent to a professional English language company. The company provide a new language certificate.
Reviewer #3:		
Avoid using references in the abstract	We agree with that and have used the desired format.	Citations were erased.
How was the infection handled? Whether as a staged procedure was done or in a single sitting u debrided and replated the osteotomy site?	Thank you. This was corrected with a single stage debridement, re canalization, and plate fixation to avoid return of deformity, continue with therapy, and the fact that patient was healthy without comorbities	Page 5 L13-22: However, at approximately 4 months postoperative, the patient presented with a deep surgical site infection with involvement of the osteosynthesis material and a non-consolidated osteotomy zone (an infected nonunion with fixation failure). Since the patient was healthy without comorbidities, she wanted to continue with therapy and avoid

		<p>recurrence of the deformity. Therefore, the benefits and risks of a single-stage revision was reviewed with the patient and she agreed to pursue this treatment. The operative procedure was carried out to remove the original plate thorough excisional debridement and to recanalize the humerus, stimulating re-osteosynthesis. The removed tissue samples were subjected to culture analyses and <i>Aerococcus viridans</i> bacteria were detected in the deep tissues. Therefore, antimicrobial therapy with clindamycin was initiated and continued for 6 weeks.</p> <p>Page 8 L9 -18: Different treatment options for surgical site infections and infected nonunions during a single or staged procedure have been discussed ^{22,23}. Due to the fact that our patient presented with infection 4 months postoperatively, nonunion with secondary infection was assumed. Wu et al.²⁴ reported a preference for single-stage treatment to address infected nonunions with Ilizarov fixation. Since our patient was healthy without comorbidities, we respected her request to continue with the initial therapy in order to avoid external fixation or recurrence of the deformity. Therefore, thorough debridement and hardware exchange were performed as a single-stage revision. Olszewski et al.²² reported their support of such an approach, based upon their data showing that 78% of patients healed after an index procedure and were able to avoid external fixation.</p>
Language Quality Grade B		Manuscript was sent to a professional English language company. The company provide a new language certificate.