Author's response to reviews

Title: Long-Term Functional Outcome and Quality of Life following Rotationplasty for Treatment of Malignant Bone Tumors

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Author's response to reviews: see over
Dear Doctor Longo,

Thank you very much for the kind consideration of our manuscript
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“Long-term functional outcome and quality of life following rotationplasty for treatment of malignant tumors”

and the valuable recommendation of the reviewers. We feel that the manuscript has been substantially improved.

In the following we will explain the revisions that have been made. We are responding to the editorial requirements and we have also enclosed a point-by-point response to the referees’ critique. Hence it is a privilege to resubmit the revised version.

Indexed overview of reviewers’ comments:

Dimosthenis Andreou

1. “The authors compare their results regarding the SF-36 score with the results of a representative german population and come to the conclusion, that patients following rotationplasty have significantly higher scores with regards to vitality, social functioning and mental health. In their discussion (lines 206-208), they state that they do not believe that differences in patients’ characteristics (as in age and gender) are a possible reason, but rather that tumor patients are highly satisfied with a rotationplasty. This conclusion is unfounded. The study the authors themselves cite under [1] demonstrates, that both age and gender have a significant influence on the SF-36 scores.”

Thank you for this important consideration. We have made the following corrections to former line 206-208: “The reason for this
finding is hard to understand. The study is limited due to the retrospective nature of the analysis which could lead to a selection bias. Also the collection of cases was limited to a single institution and was based on a relatively small number of cases, which may also have led to bias. However the study provides initial evidence that tumor patients who are treated with rotationplasty are highly satisfied with their situation in the end and this is represented by our results”.

2. “I am not sure, whether the Ankle-Hindfoot Scale and the Lysholm-Bruns score are appropriate for patients following rotationplasty. Have these scores been validated in these patients?”

Thank you. We have intensively discussed this issue and we have decided to follow your suggestion and the both scores were entirely removed from the manuscript (including former Figure 2).

3. “The Lysholm-Bruns score assesses among others the ability of the patient to walk on their toes or heels. Patients following rotationplasty per definition cannot achieve this. It appears odd, that the authors state in their results, that some patients had no restrictions in these activities.”

Please see Point 2. We have removed the Lysholm-Bruns score.

4. “The authors state that the patients had an average score of 4.1 in the Tegner-activity scale. Ideally, this scale should be used to assess the differences in activity level prior to an injury (or in this case an operation) and afterwards, in order to evaluate possible differences in the activity levels. The discussion of these results (lines 231-233) will not help the readers, in my opinion, to understand what these results actually mean, if they are not familiar with the Tegner scale.”

Thank you that you pointed out that this was not clear for the reader. We removed “With an average Tegner score of 4.1±0.6 our patients scored only 1.6 points below a healthy cohort and felt able to conduct moderately heavy work [40]” and replaced it by “With an average Tegner score of 4.1 our patients felt able to perform moderately heavy work and some recreational sports. In comparison a healthy cohort achieved nearly two grades more (5.7) and was therefore able to perform heavy labor, competitive sports and recreational sports several times a week [41]”.

5. “Methods, lines 110-113: The authors state that the Ankle-Hindfoot Scale and the Lysholm-Bruns Score range between zero and ten. That is the case for the Tegner activity scale (which is not further presented in the methods section of the paper), but not for the other two scores. All 3 scores/scales should be briefly described in the methods section of the paper.”

We have described the Tegner activity scale in the methods section, the other two scores have been removed. We added to the methods of
the paper: “The Tegner activity score ranges from zero to ten. While an activity level of zero means sick leave or disability because of knee problems, a level of ten means that the person belongs to the national elite in competitive sports [24]. Five means that the patients are able to perform heavy labor and recreational sports twice a week [24]”.

6. “Lines 91-92: The authors state, that all patients treated with rotationplasty were in their institution were enrolled. The statement is rather misleading, as only 12 of 23 possible patients could be enrolled (lines 124-125).”

Thank you for the valuable remark. We have changed the statement to: “All patients who had been treated with rotationplasty for malignant bone or soft tissue tumors of the lower extremity at our academic MSTC between May 1991 and June 2001 were identified from our database.”

7. “Lines 255-256: The authors conclude that “few postoperative complications make rotationplasty attractive for treatment of bone tumors in young patients”. This is more a hypothesis and not a conclusion, as this is not supported by the results of the present study. In order to draw such a conclusion, the authors would have to compare the results of all possible surgical treatments for bone tumors in young patients in their institution.”

Thank you for pointing out that this conclusion was wrong. We have changed the statement “Few post-surgical complications and intact growth plates make rotationplasty additionally attractive for treatment of bone tumors in young patients” to “Rotationplasty should be considered for treatment of bone tumors in young patients as the growth plates stay intact”.

8. “The title of the paper states that the rotationplasty was performed for treatment of primary malignant bone tumors. However one patient (line 91-92, table 1) apparently had a soft tissue sarcoma.”

Thank you. The title was changed to “Long-term functional outcome and quality of life following rotationplasty for treatment of malignant tumors”

9. “Lines 58-60: Primary malignant bone tumors have different peak ages, I would rephrase this sentence.”

The sentence was misleading. The first paragraph of the background was concentrating on bone tumors, but since one patient had a soft tissue sarcoma we have changed it to: “Sarcomas account for approximately 1% of all adult cancers [1]. Whereas soft tissue sarcomas are more frequently found in middle aged and older adults [1], most bone tumors are concentrated in children and adolescents [2, 3]. The most frequent diagnosed malignant bone tumors are osteosarcoma, chondrosarcoma and Ewing’s sarcoma”
[2, 3]. Progress in treatment regimens including (neo-)adjuvant and surgical therapy has markedly improved the overall survival rates over the last decades [4].

In addition we changed the following sentence “Today only a minor percentage of patients require primary limb amputation [3, 5-9].”

10. “Line 101, line 142: Please check the phrasing.”

Line 101: We have corrected the sentence to "The scoring for each dimension ranges from zero (poor) to 100 (excellent)."

Line 142: We have corrected it to “Mental health: Vitality was 75.0 ± 12.8, social functioning turned out to be 98.9 ± 3.6, emotional role functioning accounted for 88.2 ± 23.9 and mental health showed a value of 89.6 ± 10.1”

11. “Line 132: The Cooperative Osteosarcoma Study Group is abbreviated as COSS, not COS.”

“COS” was changed to “COSS”

12. “Line 136: Did the 11 patients who could not be evaluated with regards to functional outcome have other/further complications?”

Thank you, we clearly missed to provide this information. We have included in the beginning of the results “Nine patients could not be included as they were dead of disease at the time the study was performed. Two patients were lost for follow-up”.

13. “Results, (e.g. line 150): standard deviation is usually abbreviated as SD.”

“STDEV” was replaced by “SD” within the whole manuscript.

14. “It is not reasonable to state percentages (e.g. results lines 159, 160 etc), when the study included well under 100 patients - 12 in this case.”

Thank you. We have deleted the percentages.

15. “Line 194: The authors state that the objective of the study was to evaluate outcomes in patients who underwent rotationplasty for tumors around the knee. 4 patients had a B1,2 or 3 rotationplasty, which is used for tumors of the proximal and not the distal femur.”

Thank you. We have corrected the sentence to “Therefore the objective of this retrospective study was to evaluate the long term outcome as well as quality of life in patients who underwent rotationplasty for the treatment of a malignant bone or soft tissue tumors”.
16. “Table 1: Was the B3 a BIIla or a BIIlb rotationplasty?”

A BIIla rotationplasty was performed. We changed “B3” to “BIIla”. Accordingly all other Arabic numerals were changed to Roman numerals for the Winkelmann classification.

17. “Lines 69-72: I would propose classifying the complications according to Henderson et al.”

Reviewer 4 suggested us to revise the Background section and pointed out that complications were not the focus of our study: “Introduction: the first 2 paragraphs read as for the reconstructions and complications, however, the rationale is for function. Therefore, the text should be revised as for the function of the different reconstruction/amputation methods.”

We therefore removed line 9-72 and we hope that you can accept this as it was only a discretionary revision.

Andreas F Mavrogenis

1. “Abstract: lines 50-51: probably it is a typing error. Conclusion: please revise as per your conclusions.”

Thank you for this important remark. We have deleted the former conclusion in the abstract and we have inserted “The presented long-term results indicate that rotationplasty provides a relatively high quality of life and that patients are satisfied with a good functional outcome regarding activities of daily life”.

2. “Introduction: the first 2 paragraphs read as for the reconstructions and complications, however, the rationale is for function. Therefore, the text should be revised as for the function of the different reconstruction/amputation methods.”

Thank you for helping us regarding this issue. We have deleted the following paragraph which was dealing with complications: “However, patients with endoprosthetic 67 reconstruction suffer 4 times more likely from complications compared to ablative therapies [13]. 68 Common complications include mechanical failure such as periprosthetic fracture or aseptic 69 loosening, biologic failure due to infection, soft tissue damage, limb length discrepancies and 70 secondary amputation [14, 15]”. In addition we have deleted: “Post-surgical complications such as vascular injury, fracture and 74 wound complications occur less frequently than following arthroplasty [21, 22]”.

We have included an appropriate citation to “Today only a minor percentage of patients require primary limb amputation [3, 5-9]”.
Following the suggestions of reviewer 2 we have also deleted the following paragraphs from the discussion that were also dealing with complications:

“Novel treatment options have dramatically improved the prognosis of patients with non-metastatic malignant bone tumors [5]. Additionally, only a minority of patients still requires an ablative therapy. The risk for complications such as mechanical failure, infection or soft tissue breakdown, however, is four times higher compared to ablative therapies [31-33]. The application of rotationplasty showed promising results for life quality and functional outcome in the short and mid-term but only few studies exist elucidating the long-term results after rotationplasty [17-19]. ..... Three of our patients needed revision surgery. Common complications such as pathologic fracture, vascular compromise or wound infection with secondary amputation did not occur [35, 42]. High revision rates between 10% and 58% are reported for endoprosthetic reconstructions in the literature [43-45]. Implant replacement is additionally frequently required in young patients due to growth, greater life expectancy and higher levels of activity [46, 47]. The results of our study confirm that rotationplasty shows few complications and high satisfaction as well as quality of life even in the long term. This is additionally emphasized by the fact, that eleven of our patients would choose a rotationplasty again, given the choice between amputation, prosthesis or rotationplasty”.

3. “Please add a paragraph regarding the indications of rotationplasty, with appropriate citations.”

The literature states that rotationplasty is indicated in growing children with joint involment and we have added with appropriate citations: “It is commonly known that most malignant bone tumours occur in children and young adults at the lower extremity [28]. With distinct progress in treatment over the last years amputation is less often necessary and other therapy options such as arthroplasty, endoprosthesis or even rotationplasty can be performed [29-31]. In growing children and for resections with knee joint involvement an expendable prosthesis or rotationplasty should be considered [28].”.

4. “Discussion: please shorten to 2/3. Please add a paragraph regarding how these patients differ and why they do better than typical amputees. Ideally, the study should have included a cohort of patients with amputation around the knee for tumors.”

We have deleted from the discussion: “Novel treatment options have dramatically improved the prognosis of patients with non-metastatic malignant bone tumors [5]. Additionally, only a minority of patients still requires an ablative therapy. The risk for complications such as mechanical failure, infection or soft tissue breakdown, however, is four times higher compared to ablative therapies [31-33]. The application of rotationplasty showed promising results for life quality and functional outcome in the short and mid-term but only few studies exist elucidating the long-term results after rotationplasty [17-19].”
We have also removed: “Three of our patients needed revision surgery. Common complications such as pathologic fracture, vascular compromise or wound infection with secondary amputation did not occur [35, 42]. High revision rates between 10% and 58% are reported for endoprosthetic reconstructions in the literature [43-45]. Implant replacement is additionally frequently required in young patients due to growth, greater life expectancy and higher levels of activity [46, 47]. The results of our study confirm that rotationplasty shows few complications and high satisfaction as well as quality of life even in the long term. This is additionally emphasized by the fact, that eleven of our patients would choose a rotationplasty again, given the choice between amputation, prosthesis or rotationplasty”.

Thank you for the important comment on controls with amputation. We are aware that ideally the study should have included a cohort of patients with amputation around the knee for tumor. Unfortunately we could not provide aged matched controls, but very few data on long term QOL outcome exists and we think it is important to report our cases.

We hope that our revised manuscript now meets the criteria for publication in BMC Musculoskeletal Disorders.

Respectfully,

Chlodwig Kirchhoff, MD