



**ESPS PEER-REVIEW REPORT**

**Name of journal:** World Journal of Orthopedics

**ESPS manuscript NO:** 24186

**Title:** Three-dimensional reconstructed magnetic resonance scans: Accuracy in identifying and defining knee meniscal tears

**Reviewer's code:** 02691156

**Reviewer's country:** Greece

**Science editor:** Jin-Xin Kong

**Date sent for review:** 2016-01-14 17:24

**Date reviewed:** 2016-01-24 22:55

CLASSIFICATION	LANGUAGE EVALUATION	SCIENTIFIC MISCONDUCT	CONCLUSION
<input type="checkbox"/> Grade A: Excellent	<input checked="" type="checkbox"/> Grade A: Priority publishing	Google Search:	<input checked="" type="checkbox"/> Accept
<input checked="" type="checkbox"/> Grade B: Very good	<input type="checkbox"/> Grade B: Minor language polishing	<input type="checkbox"/> The same title	<input type="checkbox"/> High priority for publication
<input type="checkbox"/> Grade C: Good	<input type="checkbox"/> Grade C: A great deal of language polishing	<input type="checkbox"/> Duplicate publication	<input type="checkbox"/> Rejection
<input type="checkbox"/> Grade D: Fair	<input type="checkbox"/> Grade D: Rejected	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Minor revision
<input type="checkbox"/> Grade E: Poor		BPG Search:	<input type="checkbox"/> Major revision
		<input type="checkbox"/> The same title	
		<input type="checkbox"/> Duplicate publication	
		<input type="checkbox"/> Plagiarism	
		<input checked="" type="checkbox"/> No	

**COMMENTS TO AUTHORS**

The purpose of this study was to determine whether 3D reconstruction from conventional MRI is able to accurately detect a meniscal tear, and define the configuration. The structure of the manuscript is according to the guidelines of WJO. The title is referring directly to the problem at hand and the abstract is rather comprehensive. The Introduction of the study is short and the authors emphasize that the importance of the knee menisci are vital to tibiofemoral contact mechanics and joint longevity. Although MRI is commonly used to diagnose a meniscal tear, this however relies heavily on specialist radiological interpretation for diagnosis. With current advancement in 3D reconstruction technology, this study aimed to determine whether 3D reconstruction of meniscal tears using current MRI protocols could accurately identify meniscal tears, and define their configuration. Materials and methods The authors use the following subtitles: Sample population, MRI features, 3D reconstruction and 3D image analysis. The population consisted of 24 meniscal tears in 24 patients, and nine control menisci. In all cases arthroscopy was performed after preoperative MRI had indicated a potential meniscal tear. All patient MRI data for the 3T scans were



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imported into the Materialize Interactive Medical Control System (MIMICS) 3D reconstruction software program. Two surgeons, both familiar with the different types of meniscal tears, reported on the reconstructions. Results The accuracy for both observers and for bucket handle tears was 80%. However it had a lower accuracy in determining the remaining menisci tear configurations. It seems, that it is not possible, for the moment, to accurately determine menisci tear extension to the periphery, and consequently neither to predict the healing process between red and white zone. Discussion The authors state that MR diagnosis of a meniscal tear relies both on signal contrast and morphology. In identifying meniscal tear presence or absence, the accuracies, sensitivities and specificities, as well as positive and negative predicative values in this study were equal to those obtained from MRI. Investigating by meniscal tear configuration, 3D reconstruction appeared useful in identifying normal menisci. However it had a lower accuracy in determining the remaining meniscal tear configurations. Minimising these inaccuracies will increase the MRI quality, and hence the meniscal tear definition in 3D reconstruction. Adopting an isotropic volume scan protocol for clinical knee MRI scanning eliminates the interslice gaps, as the whole volume is scanned simultaneously. Conclusion Uni-planar 3D meniscal tear reconstruction is useful in identifying normal menisci and menisci with bucket handle tears. It however is unable to accurately report the remaining meniscal tear configurations. References are including 26 published papers. Finally, there is no doubt that, with the submitted manuscript, the authors present an innovative technique, in order to improve 3D Reconstructed magnetic resonance scans. This tri-planar reconstruction is anticipated to have finer meniscal tear and border definition, increasing the accuracy in differentiating between the morphologically similar tears. Although the proposed 3D MRI reconstruction reached an 80% of diagnostic accuracy for bucket handle meniscal tears and a lower accuracy for the remaining tears, on the other hand, arthroscopy is the therapeutic modality that complete, both the diagnostic accuracy and the desired treatment. Nevertheless, the proposed diagnostic method helps and adds definitively high quality diagnostic accuracy to take the right decision. The submitted manuscript in the present form, possess both scientific and practical value and should be accepted for publication.



ESPS PEER-REVIEW REPORT

Name of journal: World Journal of Orthopedics

ESPS manuscript NO: 24186

Title: Three-dimensional reconstructed magnetic resonance scans: Accuracy in identifying and defining knee meniscal tears

Reviewer's code: 02699758

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Science editor: Jin-Xin Kong

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CLASSIFICATION	LANGUAGE EVALUATION	SCIENTIFIC MISCONDUCT	CONCLUSION
<input type="checkbox"/> Grade A: Excellent	<input checked="" type="checkbox"/> Grade A: Priority publishing	Google Search:	<input type="checkbox"/> Accept
<input type="checkbox"/> Grade B: Very good	<input type="checkbox"/> Grade B: Minor language polishing	<input type="checkbox"/> The same title	<input type="checkbox"/> High priority for publication
<input checked="" type="checkbox"/> Grade C: Good	<input type="checkbox"/> Grade C: A great deal of language polishing	<input type="checkbox"/> Duplicate publication	<input type="checkbox"/> Rejection
<input type="checkbox"/> Grade D: Fair	<input type="checkbox"/> Grade D: Rejected	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Minor revision
<input type="checkbox"/> Grade E: Poor		BPG Search:	<input checked="" type="checkbox"/> Major revision
		<input type="checkbox"/> The same title	
		<input type="checkbox"/> Duplicate publication	
		<input type="checkbox"/> Plagiarism	
		<input checked="" type="checkbox"/> No	

COMMENTS TO AUTHORS

The authors demonstrated the accuracy for meniscal tears on 3D reconstructed MRI. Although diagnostic accuracy of meniscal tear presence was high, accuracy of the tear type was extremely low. They stressed the importance of advance of MRI quality in the discussion. So far, there have been very few papers that demonstrated the clinical use for the 3D reconstructed images of menisci in the literature. Therefore, I recommend this paper to be published. But, the problem is the very low accuracy for detecting the tear types on 3D reconstructed images, unfortunately. The authors should compare the accuracy for detecting the tear type between 3D reconstructed images and conventional 2D MR images as the arthroscopic findings are gold standard. And once again, they should demonstrate the advantages of 3D MRI over conventional 2D MR images and also the limitation of the 3D reconstructed images. If the authors can resolve the above assignment, I would be in favor of the publication of their report.



**ESPS PEER-REVIEW REPORT**

**Name of journal:** World Journal of Orthopedics

**ESPS manuscript NO:** 24186

**Title:** Three-dimensional reconstructed magnetic resonance scans: Accuracy in identifying and defining knee meniscal tears

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CLASSIFICATION	LANGUAGE EVALUATION	SCIENTIFIC MISCONDUCT	CONCLUSION
<input type="checkbox"/> Grade A: Excellent	<input type="checkbox"/> Grade A: Priority publishing	Google Search:	<input type="checkbox"/> Accept
<input type="checkbox"/> Grade B: Very good	<input type="checkbox"/> Grade B: Minor language polishing	<input type="checkbox"/> The same title	<input type="checkbox"/> High priority for publication
<input type="checkbox"/> Grade C: Good		<input type="checkbox"/> Duplicate publication	
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<input type="checkbox"/> Grade E: Poor	<input type="checkbox"/> Grade D: Rejected	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Minor revision
		BPG Search:	<input type="checkbox"/> Major revision
		<input type="checkbox"/> The same title	
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		<input type="checkbox"/> Plagiarism	
		<input checked="" type="checkbox"/> No	

**COMMENTS TO AUTHORS**

This study is a good reference to achieve a necessary improvement in the field of diagnosis of meniscal lesions, but I have some concerns to be taken into account: 1. First paragraph of introduction is not relevant. Delete it. 2. Start Material and Methods by specifying the study design. 3. Why did you not include longitudinal non-displaced tears in your analysis? 4. Have you made some differentiation between traumatic and degenerative tears? What was the training by the Materialise staff in using the software? How long it took? How was the risk of bias of these reconstructions? 5. How was the 3D meniscal model produced? 6. What was the training of observers? Who teach that training? How long it took? Was the learning curve similar for the two observers? 7. Please, report the mean and range of elapsed time between MRI and the arthroscopy. 8. The degree of agreement of observers is low limiting the value of results. 9. Exhibiting equal accuracy, sensitivity and specificity, as well as positive and negative predictive values in identifying meniscal tear presence or absence, it seems of little relevance the advantage of 3E MRI over conventional MRI. 10. How is the difference in cost between the two techniques? 11. You claim that all those parameters



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are not dependent on the radiologic skill or experience for interpretation, but the observers needed training to become familiar with meniscal appearances in 3D, being poor the degree of intra- and inter-observer agreement in this interpretation. 12. Please, discuss limitations of the study, taking into account sources of potential bias or imprecision.