Reviewer's report

Title: Template-based temporomandibular joint puncturing and access in minimally invasive TMJ surgery (MITMJS) – a technical note and first clinical results

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Reviewer: Andreas Neff

Reviewer's report:

With "Template-based temporomandibular joint access in minimally invasive TMJ surgery (MITMJS) - a technical note and first clinical results" the authors describe a new technique transferring CAD-CAM-techniques to TMJ minimally invasive surgery (or more exactly TMJ puncturing). The article is written in apparently good English and is written both fluently and concisely and well structured.

The reviewer, however, had already got the opportunity to serve as a reviewer for a first version of the article when submitted to a different journal. The authors by now slightly modified their submission and duly integrated/addressed some of the major criticisms according to the first review into the revised version of the article.

Basically, the article thus has been significantly improved compared to the previous version mentioned above. Nevertheless some points still need to be considered as critical and/or need to be clarified or stressed more profoundly in the present version.

Accordingly, the article is now correctly declared as a technical note regarding the removable guide, which is basically a clever design. Nevertheless, the article still does not offer any advanced clinical data, e.g. comparing the new technique to the conventional puncturing techniques. Declaring the paper a technical note, however, now helps to heal this drawback.

In the following comments, the Reviewer alludes to the previous major criticisms and comments on the solutions provided by the authors according to the present submission:

Regarding 1st major point of previous criticism:

As criticised before, the relevant clinical problem in MITMJS is less the puncturing technique itself (as primarily addressed in the paper), but first of all navigation/orientation during triangulation and most of all manipulation (!) within the joint, i.e. to visualize all important structures without losing the correct position of the trocar/endoscope during intraoperative
manipulation (!) (please note: the trocar should be re-inserted as few times as possible). The puncturing aid will not help to solve this problem, which is much more addressed by intraoperative changes of mandibular position (which cannot be reasonably simulated preoperatively, even less so in most clinical conditions requiring arthroscopy and MITMJS)

So the article still (!) needs to get a different and better fitting title: e.g "A surgical template to facilitate TMJ puncturing technique etc", as already proposed in the first review. As already pointed out there, advanced MITMJS (i.e. intraoperative surgery via double puncturing technique) is a much more challenging procedure than the mere puncturing alone and requires a full three-dimensional manoeuvre within the joint cavity, which again requires continuous intraoperative changes of mandibular position (cf. above) usually performed by the assisting surgeon/nurse.

So the article really should focus on being a puncturing aid and frankly stress the limitations of the procedure (so it may be a help rather for novices and for selected cases for experienced surgeons)

2nd point of previous major criticism:

The reviewer already remarked in the first version of the now revised paper that the puncturing technique is usually recommend to be done in different jaw positions during first and second puncture (mouth open in protrusion/laterotrusion for the first puncture for the superior-posterior joint space, second anterior puncture in mouth closed position, however both of them are performed under some form of intraoperative distraction).

As already pointed out before - except for arthrocentesis in needle or small canula technique - this is usually done and often even only possible under muscle relaxation viz. under general anesthesia, so a sufficient simulation via preoperative splint during CBCT/CT is often not yet (!) possible at the time of the pre-op CBCT scan.

The authors now mention the possibility to simulate these different jaw position preoperatively via splints to answer to this criticism of the first review.

This sound basically logical at first glance, but will not withstand a critical analysis: if done so as described now in the paper, this would mean:
a) at least twice CBCT/CT with then double irradiation dose (highly questionable for a primarily puncturing aid, then)

b) does not warrant a successful atraumatic puncture, as the second puncture should deliberately be performed under direct visualization of the entry site via the first Portal scope, at least according to state of the art!

So the described technique requires two (basically preventable!) CBCTS/CTs, and may allow for putting the first and second scope in, but still mostly not in the recommended optimum position (that's why the second puncture should be done under direct visualization and not according to any CT planning, cf. recent respective publications, no improvement of puncturing e.g. by ultrasound etc.)

At any rate, the authors should stress these still presenting as major (!) drawbacks in the discussion. As long as the technique is declared as a puncturing aid for novices (and not for advanced MITMJS) this would be OK, then

3rd point of major previous criticism:

According to the previous review, for a more advanced practitioner in arthroscopy the device appears to be of less help/unnecessary, but may be useful in selected cases, however at high costs for planning. The authors now basically addressed the cost problem (still very high planning time), but so far did not address the irradiation hygiene aspects.

The underlying problem is, that experience (which can and should be trained in a cadaver lab first!) will allow to avoid irradiation, so the indication for CBCT/CT in different mandibular positions is clearly problematic under both irradiation hygiene and immanent cost aspects

This at least needs to be self-critically discussed!

Recommendation to simplify the publication process:

To sum up, the guiding device needs to be declared (and critically discussed) as a basically/potentially helpful solution for beginners in the field (however affected with irradiation as a major drawback to be self-critically discussed).

Though puncturing itself is a minor or less relevant problem at least for more experienced surgeons, nevertheless this technique may be of interest even for more experienced surgeons in selected cases e.g. after reconstructive or ablative surgery etc., with a potential capacity to improve orientation, which then will justify the irradiation dose. So this should be (and then deserves to be) communicated as a technical note, then.

Personal comment cf previous review: whether it is beneficial for learners, also remains to be evaluated via a prospective randomized controlled or a matched pair series (nevertheless highly problematic due to the irradiation doses, cf. above and cf. ethical vote).
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cf. previous review

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