

# Primary surgery of subcondylar mandibular fractures using patient-specific implants: The Helsinki Protocol

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## INTRODUCTION

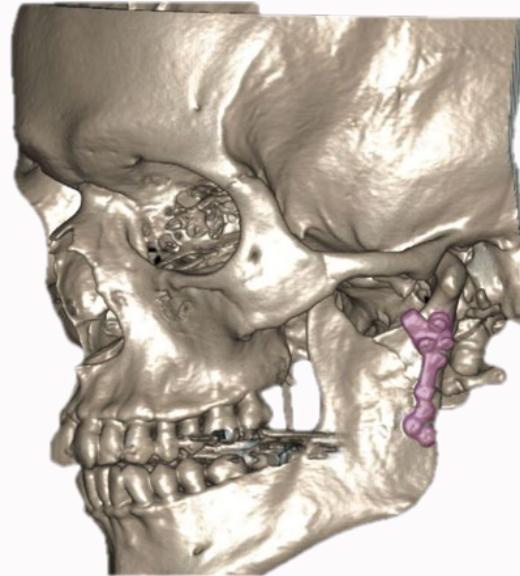
Up to date, no publications about using patient-specific implants in treatment of low mandibular condylar fractures exist. Our objective was to study the feasibility of using patient-specific implants in primary surgical treatment of mandibular condylar fractures. Our study hypothesis was that they would be effective in internal fixation of condylar fractures and could also be used as repositioning guides during the operation

## MATERIALS & METHODS

In this retrospective case series we identified patients treated surgically for unilateral low mandibular condylar fractures using patient-specific implants between 2018 and 2023 in our unit. Demographic and clinical data regarding injury mechanism, preoperative and postoperative clinical status, possible complications and length of follow up were collected from electronic patient records. Patient-specific implants were designed by biomedical engineer and operating surgeon and manufactured and delivered within 24 hours by Planmeca Ltd by milling from titanium with positioning tabs and lines indicating fracture lines to aid in repositioning during surgery. Where possible, implant positioning accuracy was measured by analyzing pre- and postoperative computed tomography images.

## RESULTS

10 patients with mean age 52.5 years consisting of 7 males and 3 females treated with patient specific implants were identified for this study with mean follow-up of 111.9 days. No severe complications were registered and no patients required reoperations. Satisfactory occlusion was acquired in all cases. 4 cases were analyzed for implant positioning with generally excellent positioning accuracy.



Sample of rigid, single piece patient-specific implant (PSI) (purple) segmented from postoperative computed tomography image.



Sample of patient-specific implant with rigid plate construction, small tabs / hooks to assist in placement on bony edges and small indentation to assist in placement along fracture line.

## CONCLUSIONS

Patient-specific implants can be used for internal fixation of lowcondylar fractures with no delay in treatment delivery and their design can also help to achieve anatomical reduction of fracture during operation. Single, sufficiently rigid plate design can be easier to place than the current standard of using 2 miniplates. In future, larger studies comparing treatment with patient-specific and standard implants should be considered to assess their relative effectiveness.

## LITERATURE CITED

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## CONFLICTS OF INTEREST

No conflicts of interest were reported for any of the authors

## FURTHER INFORMATION

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