Background
The patient is a 64-year old male who suffered a violent trauma to his head in 1978, resulting in a fractured supraorbital rim. Several attempts of surgical reconstruction were performed over the next decades but they resulted in recurring inflammations of his frontal sinus. As a last option, the frontal wall was completely removed along with portions of the outer perimeter of the eye socket.

Clinically, there were now scars in the area of the former upper margin of the bony sinus, which extended to the nasal root. The defect itself led to obvious facial asymmetry with distortion of the eyebrow (Fig. 1a-c). The patient, who is a performing musician, felt considerable distress and discouragement due to his facial distortion.

Why OSSDSIGN® Facial?
Only alloplastic materials were deemed suitable for reconstruction of this defect but due to his surgical history and the thin skin in the area, the patient was considered at high risk of developing a post-operative infection or a wound healing problem. Especially in patients with very thin skin, inert material can be susceptible to post-operative infections and soft-tissue complications. Therefore, a product from OssDsign was chosen instead.

OSSDSIGN Facial PSI consists of a calcium phosphate composition molded over a 3D printed titanium mesh structure (Fig. 2) and meets the high requirements of biocompatibility and mechanical strength in a complicated case like this. In regular clinical use, the calcium phosphate material has shown capacity to remodel into native bone over time, thereby reducing the risk for long-term complications. The ability to influence the design of the implant, including changing locations of fixation points, greatly improved the planning process.

Fig. 1 Pre-operative images and CT shows a clear facial asymmetry with a distortion of the eyebrow.

Fig 2.
3D model of the final implant design fitting to the supraorbital defect area, including the location of the pre-determined fixation arms.
Surgical procedure
As an operative approach, we opted for a supraorbital incision, that is, an arcuate incision above the eyebrow. Alternatively, a coronary incision, an incision over the scalp from ear to ear, had been indicated, but in this patient there was only a very sparse head hair, so that this incision would have been extremely conspicuous. A direct incision through the old scars was not possible, as this would have resulted in the muscle having to be severed for the lifting of the eyelids, or the tendon of this muscle would have been affected by the operation. The supraorbital access, on the other hand, allowed a good overview of the operative area to be established and the implant could be inserted and fixated without any complications. The fit of the implant was precise and in perfect accordance with previous planning.

Post-operative course and follow-up
The patient’s immediate post-operative course was uneventful, without any signs of wound healing problems or infection. Four weeks after the operation, there was only a slight edema in the area of the upper eyelid, which will resolve in the following weeks. The postoperative CT-diagnostics showed, similar to the clinical picture, a 1:1 conversion of the planning procedure.

Overall, the patient is extremely satisfied, as it is apparent that his facial symmetry of the region of the eyebrow has been restored.

Fig 3 a) The supraorbital incision has been made and a very good overview of the area established. b) OSSDSIGN Facial fitted in position and fixated with titanium screws in the integrated fixation arms. c) The incision is closed and will be covered by the eyebrow and will be less visible than a coronary incision would have been in this case.

Fig 4. Image and CT four weeks post-operatively. There was a slight edema in the upper eyelid area which decreased during the following weeks.

References