INTRODUCTION:
We present an alternative surgical procedure for posttraumatic arthrosis in proximal interphalangeal (PIP) joints. This technique differs from other volar plate interposition arthroplasty techniques\(^1,2,3,4\) described in the past and, providing there is a stable pulley refixation, it allows the reconstruction of a smooth, pain-free and stable articulation with a functional range of motion.

METHODS:
During 2017 we performed a surface replacement volar plate arthroplasty in two young patients (26 and 39 years old, both male), both showing posttraumatic destruction of the PIP joint (Fig. 3). The operations were performed by the same surgeon in a standardized procedure using a palmar approach with opening of the A3- and the distal part of the A2- pulley. The flexor tendons were retracted to either side in order to detach the palmar plate at its most proximal end (origin of the Checkrein ligaments) providing enough tissue to completely cover the articular surface of the intermediate phalange (Fig. 1/2a). The joint is exposed by a "shotgun maneuver" (Fig. 1/2b) and the palmar plate is interposed into the PIP joint (Fig. 1/2c) by suturing it to the dorsal capsule with PDS 4-0 (Fig. 1/2d). After reduction of the joint the A2- and A3- pulleys are reconstructed. In order to additionally stabilize the PIP joint for immediate postoperative mobilisation an external fixation with K-wires (Suzuki fixateur) is applied (Fig. 3). Pre-, intra- and postoperative assessments included range of joint motion, joint alignment and stability under manual stress. Pain was assessed using a numerical analog pain scale (NPS) from 0 to 10.

RESULTS:
**Patient 1.** (Fig. 3a) PIP ROM pre-operatively was flexion/extension (f/e) 50-20-0°, intra-operatively f/e 90-0-0° could be reached and remained post-operatively at f/e 90-0-0° (3 months). The joint malalignment of 14° ulnar deviation was fully corrected. The preoperative lateral instability could be compensated. Before surgery NPS score was 6/10, and decreased postoperatively to a 1/10 (at 3 months). 9 weeks after surgery the patient could return to work (carpenter).

**Patient 2.** (Fig. 3b) PIP ROM pre-operatively: only wobble movements were possible, intra-operatively f/e 80-10-0° was measured, post-operatively f/e 70-5-0° (3 months). The joint alignment remained in a neutral position with full collateral stability. NPS preoperatively was 8/10, decreasing to a score of 3/10 (3 months postoperatively). After 2 months the patient could return to work (carpenter).

CONCLUSIONS:
The volar plate arthroplasty seems to be a viable surgical approach for severely damaged PIP joints in young patients. It offers an alternative to arthrodesis, especially in workers doing heavy manual labor, where implantation of a finger prosthesis is not adequate. In our cases we could observe a good functional outcome with an important increase of range of motion. Furthermore the patients reported a marked decrease of pain, especially under axial loading. According to our limited experience the surface replacement with interposition of the volar plate is a technically simple procedure with reasonable clinical results. A long-term active motion therapy with the external fixation is crucial and has to start immediately after operation. Therefore a highly motivated patient is key for a successful outcome. Long-term results are yet to be awaited.

References:
\(^1\)Sung Yen Lin, MD, Chin-Yi Chuo, MD, Gou-Tyan Lin, MD, Mei-Ling Ho, PhD, Yin-Chun Tien, PhD, Yin-Chih Fu, MD: Volar Plate Interposition Arthroplasty for Posttraumatic Arthritis of the Finger Joints. J Hand Surg Am. 2008 Jan;33(1):35-9