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# Pulsed electromagnetic fields (PEMF) as a valid tool in orthognathic surgery to reduce post-operative pain and swelling: a prospective study

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## Abstract

**Purpose:** PEMF (pulsed electromagnetic fields) founds application in several medical fields to accelerate bone wounds healing and to reduce inflammation. The aim of our study was to evaluate

the effectiveness of PEMF in reducing postoperative swelling and pain in patients undergoing orthognathic surgery.

**Methods:** A prospective observational monocentric study was conducted on a sample of 30 patients undergone to orthognathic surgery in Maxillofacial Surgery Unit of University of Naples Federico II. The patients who followed these inclusion criteria were enrolled in the study: age  $\geq 18$  years, Class III malocclusion, Surgical procedure of Le Fort I osteotomy + Bilateral Sagittal Split Osteotomy (BSSO), Written informed consent. Patients were divided into two groups: Group SD) postoperative standard treatment with medical therapy and cryotherapy, Group SD + PEMF) postoperative standard therapy + PEMF. Each patient underwent a 3D facial scan, at one (1d) and four (4d) days after surgery to compare the swelling reduction. The pain score was assessed through VAS score and analgesics administration amount.

**Results:** In SD + PEMF group, the facial volume reduction between 1d and 4d scan was on average 56.2 ml (6.23%), while in SD group, it was 23.6 ml (2.63%). The difference between the two groups was 3.6% ( $p = 0.0168$ ). VAS pain values were significantly higher in SD group compared to SD + PEMF group in the second day after surgery ( $P = 0.021$ ) and in the total 4 days ( $P = 0.008$ ).

**Conclusions:** Our data suggest that PEMF is valid tool to promote faster postoperative swelling and pain reduction in patients undergoing orthognathic surgery.

**Keywords:** Orthognathic surgery; PEMF; Post-surgical pain; Post-surgical swelling; Pulsed Electromagnetic Field.

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