Evaluation of accuracy of CAD/CAM fabricated splints for orthognathic surgery
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The clinical outcome in orthognathic surgery depends critically on accurate preoperative planning. The need for three-dimensional preoperative assessment has been documented over the past years and conventional planning has been added by a three-dimensional computerized approach. Until now, these techniques have mainly been used in single cases, i.e. in complex asymmetric cases and not in routine clinical practice.
Computer-assisted virtual planning could on one hand replace existing conventional planning and model surgery and would on the other hand improve the accuracy of the clinical outcome.
In conventional as well as in virtual approaches, surgical splints are usually used for transferring the surgical plan to the patient. Conventional splints are manufactured on the plaster cast models, whereas in computerized approaches this is achieved using CAD/ CAM (Computer-aided design/ Computer-aided manufacturing) techniques (i.e. manufactured Rapid Prototyping techniques). However, there it is still controversy concerning the best approach to manufacturing of accurate CAD/ CAM splints.
The goal of the present study is to define a suitable workflow to produce CAD/ CAM splints in orthognathic surgery. To obtain an accurate virtual model of the dental surfaces, different radiological and surface scan modalities will be assessed. The different processing steps will be evaluated and then combined with the most suitable Rapid Prototyping manufacturing technique and material respectively. Finally, these splints will be compared with conventional manufactured splints (gold standard). The best manufacturing process will be integrated into computerized planning procedures of clinical cases.