

Influence of the design in sagittal split ramus osteotomy on the mechanical behavior

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The aim of this study was to determine the influence of the design of the sagittal split ramus osteotomy (SSRO) on the mechanical resistance to vertical forces. An in vitro study was designed for 30 test specimens. Two osteotomy models were made on two polyurethane hemimandibles, where group I presented a SSRO with an angle at vestibular level between both molars and group II presented a linear SSRO towards the basilar border. In both groups a standard osteosynthesis was performed with a 2.0 system plate and four monocortical screws, establishing sub-groups according to the degree of mandibular advancement: group A without advancement, group B with an advancement of 3 mm, and group C with advancement of 7 mm. Hemimandibles were subjected to a vertical load in the Instron machine until reaching peak load with failure, recording the value of the load and displacement. The data were analyzed with a t-test to establish statistical significance, considering $p < 0.05$. The results showed that group II presented the best response to the compressive load, tolerating the highest load values. These results were observed in almost all the groups with statistically significant differences ($p < 0.05$). By contrast, group I presented torsional forces prior to reaching system failure. It can be concluded that the osteotomy design influences mechanical resistance and that the linear SSRO offers the best mechanical resistance.

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