Abstract

OBJECTIVE: To evaluate the effects of varying numbers of layers of plaster of Paris bandages on the mechanical properties of specimens used on the construction of orthopedic splints. METHODS: Rectangular plate-shaped and cylinder-shaped specimens were constructed and assigned to two groups simulating plaster slabs and cast and further divided into six subgroups according to the number of layers used: 3, 6, 8, 10, 12 and 14 layers. The specimens were subjected to either a three-point bending test (plates/slab) or compressive strength test (cylinders/cast). The following mechanical properties were evaluated: maximum load, elastic limit load and stiffness. Specimen weight was also calculated. Data was analyzed using Kruskal-Wallis and the least significant difference (LSD) tests. RESULTS: Pairwise comparisons of the subgroups 10x12 and 10x14 revealed significant differences for all mechanical properties (p<0.05). The results of this study suggest that when the goal is to construct appliances with high mechanical strength, regardless of weight, such as serial plaster slabs splints for stimulating tissue growth through the application of gradual load, splints made with plaster of Paris bandages with 12 or 14 layers should be preferred. For orthotic devices such as positioning orthotics, the use of 10 layers plaster bandages slab splints is advisable as they were found to have better correlation between mechanical strength and weight in comparison to those made with 6 or 8 layers. CONCLUSION: Based on the findings of this study, we suggest the use of 10 layers of plaster of Paris for the construction of orthopedic splints.

Keywords
Rehabilitation, orthotic, physical properties.