Surgically assisted rapid palatal expansion is the procedure of choice for treating transverse maxillary deficiency in mature patients. Some controversies regarding surgically assisted rapid palatal expansion remain, mainly concerning technical aspects such as type and location of osteotomy sites, as well as surgical morbidity, clinical efficiency, and stability. The evaluation of transverse expansion is still a theme of discussion. On conventional anteroposterior radiographs, anatomical structures are superimposed, resulting in a high number of image artifacts, as well as hindering the tracing and evaluation. The use of computed tomography as a method of evaluating the efficiency of this procedure has not been widely reported. Consequently, few landmarks for use in evaluating maxillary expansion have been defined. The goals of the present study were to define parameters to assess skeletal changes after surgically assisted palatal expansion, to evaluate the reliability of the proposed method and to use computed tomography to assess those parameters.

From June of 2004 to May of 2005, 15 patients underwent surgically assisted rapid palatal expansion (a modified Le Fort I maxillary osteotomy without pterygomaxillary separation, together with a sagittal palatal osteotomy) according to a defined protocol, using a Hyrax appliance. To determine the pattern of transversal and anteroposterior expansion, linear and angular measurements were performed on multislice computed tomography, using computed software directly on the workstation. The anterior, intermediate and posterior portions of the maxilla were evaluated separately, using a specific method, in axial acquisition and coronal reconstructed views. The cross-sectional area of the maxilla was calculated to obtain general information about maxillary expansion. The reliability of the method was statistically confirmed. Significant maxillary overall expansion was observed. However, different patterns of expansion were seen in the three regions analyzed. In the anterior and intermediate portions of the maxilla, the increase in maxillary width was significantly greater than that observed in the posterior portion. The opening of the jackscrew was greater than skeletal expansion. Comparing jackscrew opening and transverse expansion, the same pattern of asymmetric expansion was verified. No change was observed in anteroposterior dimensions. The method of computed tomography evaluation is a useful tool for evaluation of surgically assisted rapid palatal expansion changes. The accurate evaluation of the postoperative changes was heavily dependent upon images acquired through computed tomography. An overall maxillary expansion was confirmed. However, transverse expansion of the maxilla achieved through surgically assisted rapid palatal expansion without pterygoid plate separation was less than uniform.

Descriptors: Palatal expansion techniques; oral surgical procedures; X-ray computed tomography; evaluation; craniofacial abnormalities/surgery; orthodontics/methods.