# MEASUREMENT OF A TRANSLATION AND A ROTATION OF A TOOTH AFTER AN ORTHODONTIC TREATMENT USING GA

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ABSTRACT. *The purpose of our study is measurement of the value of the translation and the rotation between the corresponding teeth of digital dental models before and after orthodontic treatment. We used digital models from plaster models digitized by 3D scanner, and divide the polygons into several teeth using our original GUI. We measured the distance from a polygon in the jaw before the treatment to the nearest polygon in the after jaw and consider the distance as a fitness value. We got the best motion (translation and rotation) parameters using GA and reported them as the measurement of the tooth motion after the treatment. And we checked the accuracy of the result.*
**Keywords:** Orthodontic treatment, Dental digital model, GA, 3D measurement

1. **Introduction.** Recently in the orthodontics area, many IT technologies are used. Kusnoto and Evans [1] used VIVID700 (3D scanner with infra-red LASER beam) and reported that in the dental area the scanner data have accuracy up to 0.2mm. Santoro et al. [2] compared a conventional manual measurement and OrthoCAD. They concluded that digital models were clinically acceptable in orthodontics the same as plaster models and inter-examiner error differs from 0.16mm to 0.49mm. Rheude et al. [3] said that digital models and plaster models are clinically insignificant using under-15-years carrier orthodontists' and over-15-years carrier orthodontists' works. Costalos et al. [4] said in comparison between OrthoCAD models and plaster models that under-0.5mm differences are clinically insignificant. Enciso et al. [5] made an animation of CT 3D model of human jaws using Zebris jaw motion analyzer. Paukens et al. [6] applied stereo-lithograph from CT using photopolymer to a cranio-maxillofacial surgery.