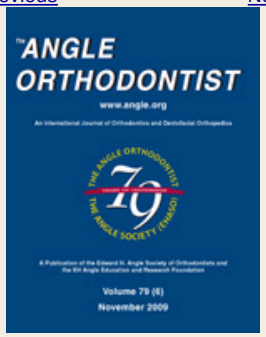
Volume 79, Issue 4
(July 2009)

< Previous Next >



Current Issue
Available Issues

Journal Information

ISSN: 0003-3219
Frequency: Bimonthly

Previous Article Volume 79, Issue 4 (July 2009) Next Article

Add to Favorites Share Article Export Citations Track Citations Permissions

Full-text PDF

Bo-Mi Kim, Bo-Yeong Kang, Hong-Gee Kim, Seung-Hak Baek (*2009*) Prognosis Prediction for Class III Malocclusion Treatment by Feature Wrapping Method. The Angle Orthodontist: Vol. 79, No. 4, pp. 683-691.

Original Articles

Prognosis Prediction for Class III Malocclusion Treatment by Feature Wrapping Method

Bo-Mi Kim[a], Bo-Yeong Kang[b], Hong-Gee Kim[c], and Seung-Hak Baek[d]

Abstract

Objective: To use the feature wrapping (FW) method to identify which cephalometric markers show the highest classification accuracy in prognosis prediction for Class III malocclusion and to compare the prediction accuracy between the FW method and conventional statistical methods such as discriminant analysis (DA).

Materials and Methods: The sample set consisted of 38 patients (15 boys and 23 girls, mean age 8.53 ± 1.36 years) who were diagnosed with Class III malocclusion and received both first-phase (orthopedic) and second-phase (fixed orthodontic) treatments. Lateral cephalograms were taken before (T0) and after first-phase treatment (T1) and after second-phase treatment and retention (T2). Based on the measurements taken at the T2 stage, the patients were allocated into good (n = 20) or poor (n = 18) prognosis groups. Forty-six cephalometric variables on T0 lateral cephalograms were analyzed by the FW method to identify key determinants for discriminating between the two groups. Sequential forward search (SFS) algorism and support vector machine (SVM) were used in conjunction with the FW method to improve classification accuracy. To compare the prediction accuracy of the FW method with conventional statistical methods, DA was performed for the same data set.

Results: AB to mandibular plane angle (°) and A to N-perpendicular (mm) were selected as the most accurate cephalometric predictors by both the FW and DA methods. However, classification accuracy was higher with the FW method (97.2%) compared with DA (92.1%), because the FW method with SFS and SVM has a more precise classification algorithm.

Conclusions: The FW method, which uses a learning algorithm, might be an effective alternative to DA for prognosis prediction.

Keywords: Class III malocclusion, Prognosis prediction, Feature wrapping method, Sequential forward search algorithm, Support vector machine

Accepted: August 2008;

[a] Graduate MS student, Department of Orthodontics, School of Dentistry, Dental Research Institute, Seoul National University, Seoul, South Korea

[b] Assistant Research Professor, Department of Dental Management and Informatics, Dental Research Institute, Seoul National University, Seoul, South Korea

[c] Associate Professor, Department of Biomedical Knowledge Engineering, School of Dentistry, Seoul National University, Seoul, South Korea

[d] Associate Professor, Department of Orthodontics, School of Dentistry, Seoul National University, Seoul, South Korea

Corresponding author: Dr Seung-Hak Baek, Department of Orthodontics, School of Dentistry, Dental Research Institute, Seoul National University, Yeonkun-dong #28, Jongro-ku, Seoul, South Korea 110-768 (drwhite@unitel.co.kr)