

Akurasi analisis Bolton dan Little Irregularity Index pada model studi digital hasil pemindaian Laser kasus kelas I Anterior Crowding = The accuracy of Bolton analysis and Little Irregularity Index on class I cases with Anterior Crowding digital study models

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Abstrak

Pendahuluan: Kemajuan teknologi digital untuk memenuhi kebutuhan akan efisiensi saat ini tidak terelakkan, termasuk di bidang ortodontik. Selain foto rontgen, model studi merupakan alat diagnostik yang diubah menjadi bentuk digital. Digitasi model studi dilakukan supaya pengukuran benda tiga dimensi dapat diukur dalam bentuk tiga dimensi. Walaupun demikian, ketidakakuratan bisa saja terjadi pada pengukuran dengan model studi digital tiga dimensi. Ketiadaan perangkat digitasi di Indonesia menyebabkan proses digitasi menjadi mahal dan sukar. Oleh karena itu, alat pemindai laser yang diciptakan oleh Institut Teknologi Bandung bekerjasama dengan Bagian Ortodonti Universitas Indonesia pada tahun 2011 diharapkan dapat mengatasi masalah-masalah tersebut. Dalam penelitian ini, peneliti menguji akurasi analisis ortodontik dengan menggunakan alat pemindai laser yang baru dibuat ini.

Bahan dan Cara: Duabelas pasang model studi sebelum perawatan ortodontik disertai anterior crowding dengan skor indeks Little 1-6 digunakan dalam penelitian ini. Masing-masing model studi dipindai, dan dilakukan digitasi dan analisis Bolton dan indeks ketidakteraturan Little (LII) diukur pada model studi konvensional dan digital dengan kaliper yang memiliki ketelitian 0.01 mm. Pengukuran intraobserver dilakukan pada 20% total sampel yang dipilih secara acak (3 sampel) dan diuji secara statistik dengan uji-t berpasangan dan Wilcoxon untuk uji nonparametrik. Plot Bland-Altman digunakan untuk menguji level of agreement kedua metode pengukuran. Uji-t tidak berpasangan dan uji Mann-Whitney digunakan untuk uji statistik pada penelitian inti dengan 12 pasang model studi.

Hasil: Uji intraobserver untuk analisis Bolton tidak memperlihatkan perbedaan bermakna ($p = 0.859$) sementara untuk pengukuran indeks ketidakteraturan Little, terlihat perbedaan yang bermakna secara statistik ($p = 0.008$). Plot Bland-Altman untuk indeks Little memperlihatkan tercapainya level of agreement kedua metode pengukuran. Pada pengukuran 12 pasang model studi, uji statistik untuk analisis Bolton dan indeks Little tidak memperlihatkan adanya perbedaan yang bermakna ($p > 0.05$), dengan nilai p berturut-turut adalah $p = 0.509$ and $p = 0.101$.

Kesimpulan: Nilai pengukuran pada model studi digital disertai anterior crowding tidak berbeda bermakna secara statistik dengan nilai pengukuran yang dilakukan pada model studi konvensional dengan anterior crowding.

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Introduction: The vastly growth of advanced technology to meet efficiency is currently inevitable, including in orthodontics. Radiographs and study models are diagnostic tools that often digitized and measured three-dimensionally. However, inaccuracy might still be found in the three-dimension measurements. The customized laser scanner was then built in 2011 by Bandung Institute of Technology in conjunction with Department of Orthodontic University of Indonesia. The primary aims were to overcome the study models storing problems and the scanning cost, if the study models have to be digitized overseas. In this research,

the study models digitizing were performed using the newly built laser scanner and the accuracy of the measurements were analyzed.

Material and Methods: Twelve pairs of pre-orthodontic treatment study models were used in this research with mild to moderate anterior crowding (Little Irregularity Index score 1-6). Each models were scanned and the mesiodistal width was measured before Bolton analysis was determined. For Little Irregularity Index, each measurements were done in the anterior of lower study models. The measurement of conventional study models were then compared with the digital study models measurement. Each measurement were made with digital calliper to the nearest of 0.01 mm. Intraobserver test was done by taking 20% from the total amount of the samples (3 samples) randomly and were tested by paired t-test and Wilcoxon for nonparametric test. The level of agreement were done with Bland- Altman plot. After getting valid intraobserver test value and good level of agreement, the main test was done by paired t-test and Mann-Whitney test.

Results: Intraobserver test for Bolton analysis showed no significant difference ($p = 0.859$) while significant difference ($p = 0.008$) was detected between measurement method for Little Irregularity Index. Bland-Altman plot for Little Irregularity Index intraobserver test showed good level of agreement. The Bolton analysis and Little Irregularity Index statistic test for twelve pairs of study models showed no significant difference ($p > 0.05$), respectively $p = 0.509$ and $p = 0.101$.

Conclusion: The measurements made in digital study models with anterior crowding were as accurate as the measurements made in conventional study models with anterior crowding, and therefore, the study models measurement can be done in the digital form.