

Hubungan Persepsi Nyeri dengan Konsentrasi Substance P pada Perawatan Ortodonti Fase Aligning Awal Menggunakan Sistem Preadjusted Edgewise dan Self-Ligating = The relationship between pain perception and substance P concentrations during initial orthodontic tooth alignment, using preadjusted edgewise and self-ligating bracket systems

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Abstrak

Tujuan: (1) Untuk menganalisis persepsi nyeri, (2) untuk mengevaluasi konsentrasi substance P, dan (3) untuk mengetahui hubungan antara persepsi nyeri dan konsentrasi substance P selama fase aligning awal perawatan ortodonti cekat yang menggunakan sistem preadjusted edgewise (PE) bracket dan sistem passive self-ligating (PSL) bracket. **Metode penelitian:** Lima belas pasien (6 laki-laki, 9 perempuan; rerata usia 24,47 ± 4,26 tahun) yang menjadi subjek penelitian dibagi ke dalam tiga kelompok: pasien yang dirawat dengan sistem preadjusted edgewise, pasien yang dirawat dengan sistem passive self-ligating (PSL), dan pasien yang tidak menerima perawatan atau kelompok kontrol. Penilaian persepsi nyeri dan pengambilan cairan sulkus gingiva dilakukan pada empat waktu: sebelum pemasangan bracket dan archwire, serta 2, 24, dan 168 jam setelah pemasangan archwire. Cairan sulkus gingiva diambil dari sulkus gingiva bagian interproksimal dari gigi-geligi anterior bawah. Persepsi nyeri diukur dengan menggunakan skala analog visual. Konsentrasi substance P ditentukan dengan menggunakan enzyme-linked immunosorbent assay (ELISA). **Hasil:** Skor VAS tertinggi pada masing-masing kelompok didapati pada waktu 24 jam pasca pemasangan bracket dan archwire. Rerata skor VAS pada kelompok preadjusted edgewise lebih tinggi dibandingkan kelompok PSL pada masing-masing waktu, tetapi tidak menunjukkan perbedaan yang signifikan. Konsentrasi substance P tertinggi diamati pada 2 jam dan 24 jam pasca pemberian gaya pada kedua kelompok sistem bracket, tetapi perbedaan tersebut tidak signifikan bila dibandingkan dengan kelompok kontrol. Konsentrasi substance P pada kelompok kontrol relatif stabil, kecuali pada waktu 2 jam. Tidak terdapat hubungan antara persepsi nyeri dan konsentrasi substance P.

Kesimpulan: Persepsi nyeri dan konsentrasi substance P tidak dipengaruhi oleh sistem bracket. Tidak terdapat hubungan antara persepsi nyeri dan konsentrasi substance P antara kelompok preadjusted edgewise dan PSL. **Kata kunci:** Fase aligning; perawatan ortodonti; persepsi nyeri, substance P

Objectives: (1) To study patient pain perception, (2) to evaluate substance P concentrations, and (3) to find a possible correlation between pain perception and substance P concentrations during initial orthodontic tooth alignment using preadjusted edgewise and self-ligating bracket (SLBs) systems. **Methods:** Fifteen patients (6 males, 9 females; mean age of 24.47 ± 4.26 years) were enrolled in the study and were divided into three groups: those given preadjusted edgewise brackets, those given passive SLBs, and those given no

orthodontic treatment to serve as a control group. Pain assessment and gingival crevicular fluid (GCF) sampling were performed at four time points: before bracket placement and arch-wire engagement and then 2, 24, and 168 hours (h) after arch-wire engagement. GCF was collected from the interproximal gingival sulcus of each lower anterior tooth. Pain perception was recorded with the use of a visual analog scale (VAS). Substance P concentrations were determined by using enzyme-linked immunosorbent assay (ELISA).

Results: The highest VAS score for each group was found at 24 h following bracket placement and arch-wire engagement. The mean VAS in the preadjusted edgewise group was higher than the VAS score in the SLB group at each time point, but were not significantly different at any time point. The highest substance P concentrations were found at 2 h and 24 h after force application in both the preadjusted edgewise and SLB group, but none of these time points showed statistically significant differences between the experimental and control groups. The substance P concentration in the control group was relatively stable, except at 2 h. No correlation was found between pain perception and substance P concentrations.

Conclusions: Pain perception and substance P concentrations were not significantly different between the different bracket systems. No correlation was found between pain perception and substance P concentrations in the use preadjusted edgewise and SLB systems.

Keywords: Orthodontic tooth alignment; pain perception; substance P