

Polimorfisme Gen Bone Morphogenetic Protein-2 (BMP-2) rs 1005464 dan rs 235768 terhadap Pola serta Arah Pertumbuhan dan Perkembangan Kraniofasial pada Pasien Maloklusi Skeletal kelas I, II, dan III pada Subpopulasi di Indonesia = Bone Morphogenetic Protein-2 (BMP-2) Gene Polymorphism rs 1005464 and rs 235768 on the Patterns and Directions of Craniofacial Growth and Development in Skeletal Malocclusion class I, II, and III in Indonesian Subpopulations Patients.

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Abstrak

Tujuan: Tujuan dari penelitian ini adalah untuk mengevaluasi korelasi antara polimorfisme gen Bone Morphogenetic-2 (BMP-2) rs1005464 dan rs235768 dengan pertumbuhan dan perkembangan kraniofasial pada maloklusi skeletal kelas I, II, dan III; dan untuk mengetahui kerentanan Bone Morphogenetic Protein-2 (BMP-2) terhadap tipe wajah dan arah pertumbuhan. Bahan dan Metode: Populasi subjek terdiri dari 150 pasien ortodontik dewasa yang menjalani perawatan ortodontik di Klinik Spesialis Ortodontik Fakultas Kedokteran Gigi dan Mulut Universitas Indonesia. Subjek dibagi menjadi beberapa kelompok berdasarkan kasus maloklusi skeletal kelas I, II, dan III; tipe wajah (mesofacial, dolichofacial, brachyfacial) dan arah pertumbuhan wajah (normal, hyperdivergent, hypodivergent) dikonfirmasi dengan radiografi sefalometrik lateral. Ekstraksi DNA dilakukan dengan potongan rambut subjek, metode polymerase chain reaction, dan Sanger sequencing digunakan untuk menganalisis subjek. Koefisien korelasi Pearson dan regresi logistik berganda dihitung untuk menganalisis korelasi dan kerentanan BMP-2 rs1005464 dan rs235768, pohon filogenetik dibuat untuk mengevaluasi evolusi gen. Hasil: Distribusi genotip BMP-2 rs1005464 dan rs235768 menunjukkan distribusi yang konsisten, menunjukkan bahwa varian tersebut dapat menjadi bioindikator genetik pola pertumbuhan dan perkembangan kraniofasial. Koefisien korelasi Pearson menunjukkan bahwa BMP-2 rs1005464 dan rs235768 berkorelasi signifikan dan kerentanan dengan pasien maloklusi skeletal kelas I, II, dan III. Sanger sequencing menunjukkan adanya distribusi yang konsisten polimorfisme gen BMP-2 rs1005464 dan rs235768 dan pohon filogenetik menunjukkan BMP-2 rs1005464 memiliki kecenderungan maloklusi skeletal kelas I dan III sedangkan BMP-2 rs235768 terhadap maloklusi skeletal kelas II. Kesimpulan: Studi ini menunjukkan bahwa BMP-2 rs1005464 dan rs235768 berkorelasi signifikan, dan kerentanan terhadap pola pertumbuhan dan perkembangan Kraniofasial pada Maloklusi Skeletal kelas I, II, dan III.

.....Objectives: The purpose of this study was to evaluate the correlation between Bone Morphogenetic-2 (BMP-2) gene polymorphisms rs1005464 and rs235768 with craniofacial growth and development in skeletal malocclusion classes I, II, and III; and to determine the susceptibility of Bone Morphogenetic Protein-2 (BMP-2) against the facial types and growth direction. Materials and Methods: The subject population consisted of 150 adult orthodontic patients who underwent orthodontic treatment at the Orthodontic Clinic Specialist for the Dental Oral Education University of Indonesia. Subjects were divided into groups based on cases of skeletal malocclusion classes I, II, and III; facial types (mesofacial, dolichofacial, brachyfacial) and the direction of facial growth (normal, hyperdivergent, hypodivergent) were

confirmed by lateral cephalometric radiograph. DNA extraction was carried out by haircuts of the subjects, polymerase chain reaction method, and Sanger sequencing was used to analyze the subjects. Pearson correlation coefficients and multiple logistic regression were calculated to analyze the correlation and susceptibility of BMP-2 rs1005464 and rs235768, a phylogenetic tree was made to evaluate the evolution of the gene. Result: The genotyping distribution of BMP-2 rs1005464 and rs235768 showed a consistent distribution, indicating that these variants can be a genetic bioindicator of the growth pattern and development of craniofacial. Pearson correlation coefficients indicated that the BMP-2 rs1005464 and rs235768 were significantly correlated and susceptibility with skeletal malocclusion classes I, II, and III patients. Sanger sequencing showed there was a consistent distribution of gene polymorphisms of BMP-2 rs1005464 and rs235768 and the phylogenetic tree shows BMP-2 rs1005464 has a tendency to skeletal malocclusion classes I and III while the BMP-2 rs235768 against skeletal malocclusion class II. Conclusion: This study indicated that the BMP-2 rs1005464 and rs235768 are significantly correlated, and susceptibility to growth patterns and development of Craniofacial in Skeletal Malocclusion classes I, II, and III.