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The effect of various placement techniques on the microhardness of class II (Slot) resin composite restorations

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Abstract

Aim: To analyze the influence of various placement techniques on Vickers microhardness of Class II cavities restored using resin composite in different depths and layers. Methods and Materials: Sixty-four standardized Class II cavities (٥,٠ × ٣,٠ × ١,٥ mm^3) were prepared in sound human, maxillary premolars. The cavities were divided into four experimental groups (n=١٦) according to the composite placement technique used: incremental technique using a Palodent matrix (IP), incremental technique using a transparent matrix (IT), centripetal technique using a Palodent matrix (CP), and the centripetal technique using a transparent matrix (CT). The cavities were restored with Single Bond, Z١٠٠ composite resin system. After ٢٤ hours of storage in envelopes in an amber-colored box, the restorations were finished, polished, and kept for one week before conducting a hardness test. The microhardness test was carried out using a ٠,٥ kg load for ٢٠ seconds at different depths and layers of proximal surfaces. Statistical analysis was done using a t-test, ANOVA, and a Tukey's test (α=٠,٠٥). Results: In contrast, the matrix bands, the methods of composite insertion, had a significant effect on hardness. The greatest surface hardness of resin composite was related to the use of the centripetal technique and a transparent matrix (p<٠,٠٥). With regard to cavity depths, the hardness at the top surface was significantly greater, followed by the middle and bottom cavity depths. A greater hardness was obtained in the mesial-distal direction within the external layer compared with the middle and internal layers using the centripetal method (p<٠,٠٥). Conclusion: The kind of matrix and filling technique could have a significant effect on surface microhardness. The top surface had the greatest hardness in comparison to different depths. In the centripetal technique, the external layer of the proximal wall had greater hardness than the other layers. Clinical Significance: While the microhardness of all of the experimental placement techniques in the different depths and layers was within a clinically acceptable range, the greatest hardness was obtained using the centripetal technique with a transparent matrix, making it the technique of choice. © ٢٠٠٩ Seer Publishing LLC.

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