Study protocol:

1. The central groove of 120 first permanent molars from 30 children was probed in the university clinics by three practicing dentists. Each dentist was asked to assign a specific value to the probed tooth according to the following scale:
    - 0: The tooth is healthy and shows no chalky areas or any clinical evidence of demineralization (visual assessment).
    - 1: The tooth shows signs of demineralization, such as chalky white or brown discoloration without cavitation (visual assessment with no structural loss detected by probing).
    - 2: Cavitation is present, indicating enamel or dentin caries with structural loss detected by probing.

    Values 0 and 1 indicate that the tooth requires preventive rather than restorative treatment, while value 2 indicates that the tooth requires restorative treatment. If there was no agreement among the observers on the assigned value, the tooth was excluded from the study.

2. Each tooth was examined using the DIAGNOdent Classic laser fluorescence device:
    - Initially, the occlusal surface of each tooth was cleaned with cotton rolls, and then the examination was conducted with the DIAGNOdent device as follows:
        - Selecting the appropriate tip for examining the occlusal surface of the patient's molars.
        - Calibrating the device before starting the examination of the patient's molars.
        - Determining the baseline diagnostic value for each patient by selecting a healthy area in the middle third of the upper permanent incisors to set the zero value on the device. This procedure should be performed for each patient individually.
        - Reading the value displayed on the device screen.

The results were recorded and the clinically assigned values were compared with the fluorescence values. The following values were used to diagnose the presence or absence of cavitation: - If the value is less than 16, it corresponds to 0 or 1 (no cavitation). - If the value is 16 or greater, it corresponds to 2 (cavitation present).

The following formulas were used to calculate sensitivity and specificity: - Sensitivity = True positive cases / (True positive cases + False negative

cases) - Specificity = True negative cases / (True negative cases + False positive cases)

The values were entered, statistical tests were performed, and the results were presented using Microsoft Excel 2007