

Closure of leaks by fibrin gluing - Effects of various application techniques and temperatures.

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Abstract:

This study was performed to determine the differences in covering power obtained with fibrin gluing using three different methods, layered, mixing, and spraying. The experimental system consisted of a 2 x 2 cm plastic plate with a hole 1 mm in diameter, a plastic syringe, and a digital manometer. The internal pressure of the syringe barrel was measured with the digital manometer. Five minutes after fibrin glue membranes (1 mm in thickness) had been prepared on the plastic plate with the layered, mixing, or spray method, the plunger of the syringe was pushed slowly, and the maximum internal pressure in the syringe barrel was measured, just before the breakage of the membrane. Experiments were performed five times at each four temperatures, 12degreeC, 17degreeC, 22degreeC and 37degreeC. Covering power of fibrin glue membranes (units: mmHg; atmospheric pressure 760 mmHg) were as follows: 1) Layered method (12degreeC: 810.0 +/- 68.6, 17degreeC: 769.0 +/- 10.2, 22degreeC: 812.0 +/- 112.4, 37degreeC: 773.6 +/- 24.4). 2) Mixing method (12degreeC: 956.6 +/- 219.3, 17degreeC: 372.4 +/- 243.5, 22degreeC: 1045.2 +/- 233.0, 37degreeC: 1059.0 +/- 220.2). 3) Spray method (12degreeC: 1010.0 +/- 231.1, 17degreeC: 1144.4 +/- 170.6, 22degreeC: 1148.0 +/- 234.7, 37degreeC: 1250.0 +/- 111.8). The covering power of fibrin glue membrane obtained with layered method was significantly less than that with the two other methods at all temperatures tested. The mean covering power obtained with spray method was higher than that with the mixing method at all temperatures, significantly so at 17degreeC and 37degreeC ($p < 0.05$: two-way ANOVA). Assuming an activity of 100% at 37degreeC, the thrombin required for producing fibrin clot was 52% at 12degreeC and 81% at 25degreeC. The spray method

yields greater covering power than the other methods because it gives the best uniformity to fibrin glue membranes. Since thrombin activity is less at low temperature, less fibrin product can be made. This suggests that fibrin glue membranes yield Little covering power at low temperatures.