The aim of this study was to compare the bond strength of three different calcium silicate–based materials with different handling properties and application forms—Harvard MTA Universal Handmix (Harvard Dental International, Hoppegarten, Germany), NeoPutty (Avalon Biomed, Houston, TX, USA), and TheraCal LC (Bisco Inc., IL, USA)—when used for furcation perforation repair, and to investigate how blood contamination affects the bond strength of these materials. A total of 60 extracted two-rooted mandibular molars were sectioned with a diamond saw to expose the pulp chamber. A perforation cavity with a diameter of 1.3 mm was prepared at the center of the furcation area of each tooth specimen. The 60 mandibular molars were randomly allocated into three material groups, and each material group was further divided into two subgroups ($n = 10$) according to the presence or absence of blood contamination, resulting in a total of six groups. In the contamination groups, the repair materials were applied in the presence of fresh blood according to the manufacturers' instructions, whereas in the control groups, the same procedures were performed in a blood-free environment. After waiting for the initial setting times of the materials, all specimens were stored in an incubator for one week to allow complete setting. Following complete setting, the push-out bond strength was measured by applying a load in the coronal-to-apical direction at a crosshead speed of 1 mm/min using a 1-mm-diameter plunger. The data were analyzed using SPSS version 23. Independent samples t-tests were used to compare two groups with normally distributed data, and one-way analysis of variance (ANOVA) with Tukey post hoc tests was used for comparisons among three or more groups. For non-normally distributed data, the Mann–Whitney U test was used for two-group comparisons, and the Kruskal–Wallis H test with Dunn's post hoc test was used for comparisons among three or more groups ($p < 0.05$). In the absence of blood contamination, TheraCal LC and NeoPutty showed similar and higher bond strength values, whereas Harvard MTA exhibited significantly lower values. In the blood-contaminated groups, a statistically significant difference among the materials was found only between Harvard MTA and TheraCal LC. Blood contamination did not significantly alter the bond strength of the materials.