Technical Update: Do Not Use Discs To Finish Full-Contour Zirconia

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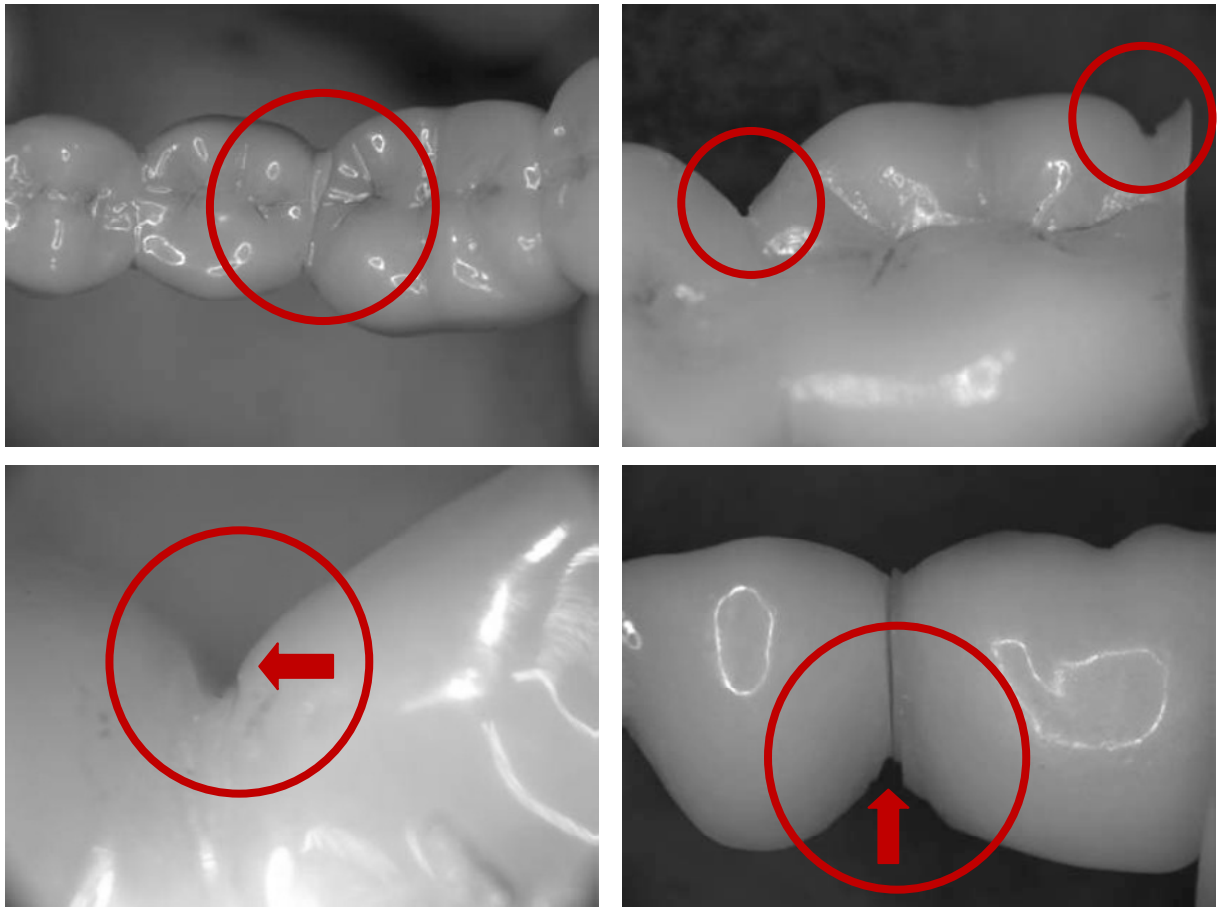
As more and more dentists prescribe zirconia restorations, we would like to review some critical areas in designing and finishing bridgework. Recent data shows zirconia single-unit fractures are the lowest of any product in laboratory's history, with PFM bridges showing three times the fracture of zirconia. However, when the lab does see a fractured zirconia bridge, it is almost always due to: 1) A diamond disc being used to separate connectors, effectively "scoring" the ceramic and increasing the odds of a failure starting at this point, or 2) Violation of the "Rule of 27" for determining connector dimensions.

It is very important not to make any adjustments to zirconia bridges after coloring and sintering. The temptation to finish and enhance the esthetics of bridge connectors by opening embrasures can lead to failures, especially when using a diamond disc. Beyond running the risk of violating the "Rule of 27" (see below), the disc creates sharp lines that may lead to cracks and imminent bridge failure. As illustrated in the 5-unit zirconia bridge case below, by enhancing the visual separation of the interproximal areas, a fatal weakness was introduced.



The size of the connectors is of paramount importance. We recommend you follow the Rule of 27 to ensure that the bridge will withstand the tremendous loads applied in the oral environment. When considering the cross sections of the connectors, the load carrying capability of a bridge is proportional to the height squared multiplied by width (=h2xw). As a result, the Rule of 27 has proven to be the minimum acceptable load capacity.

Example 1: A zirconia bridge has 3 mm high x 3 mm wide connectors.
3 mm2 x 3 mm = 3x3x3 = 27. This bridge will be able to carry a proportional load in the oral environment, according to the Rule of 27.

Example 2: A zirconia bridge has 4 mm high x 2 mm wide connectors.
4 mm2 x 2 mm = 4x4x2 = 32. This is an even better outcome.

Example 3: A zirconia bridge has 2 mm high x 4 mm wide connectors.
2 mm2 x 4 mm = 2x2x4=16. This outcome of only 16 is insufficient.

Following the processes outlined above will ensure that your zirconia crowns & bridges live up to their reputation of being virtually “bulletproof.”