

Know Your Zirconia

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Zirconia has emerged as one of the premier materials for fixed dental prostheses, thanks to its exceptional mechanical strength, biocompatibility, aesthetic appeal and ease of manufacturing. Its popularity has grown markedly over the past decade, and for good reason. Today, most dental laboratories and clinicians recommend it, and patients increasingly demand it, especially given the 10-plus-year warranty often promised. The key to clinical success is not relying on the warranty, but understanding which zirconia to use, when, and how?

Not all zirconia is the same

Zirconia used in dentistry are predominantly tetragonal zirconia polycrystals, stabilized at room temperature by yttria. This yttria content determines both strength and translucency, in other words, more the yttria content, more the translucency and lesser the strength. A typical 3 mol% of yttrium, called yttrium-stabilised tetragonal zirconia polycrystals (3Y TZP) exhibit exceptional strength but suboptimal translucency appropriate for long-span bridges, implant abutments, and high-load posterior restorations. By increasing the yttria content to 4 mol% or 5 mol% (4Y PSZ and 5Y PSZ), the partially stabilising zirconia (PSZ) offer medium to high translucency and reduced strength which are optimally suited for posterior single crowns, short bridges and anterior crowns respectively.

Attend to the vulnerabilities

- Persistent risk of chipping:¹⁻³ Concerns over chipping has largely been addressed with the introduction of multilayered monolithic zirconia which eliminates the need for veneering.⁴ These high performing dental material combines different yttria compositions, typically 3Y to 5Y to produce strength of the base layer and translucency of the incisal layer within a single blank.
- Potential abrasive nature: Considering the hardness of the material, tooth wear of the antagonist tooth was always a concern. Over the years we have understood that it wears relatively less when polished well. Further, reports have shown that a well-polished monolithic zirconia wears significantly less compared to the glazed or veneered counterparts.⁵⁻⁷
- Debonding: Salivary phosphates during try-in are a genuine threat to zirconia bonding because they competitively occupy the same active sites needed for resin cement adhesion. Sandblasting,

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cleaning with 5% sodium hypochlorite or with a proprietary ceramic cleaner are essential to remove these salivary contaminants.⁸

Choose something else

Zirconia performs well in specific situation; the problem arises when it is treated as a universal solution. There is always a room for alternative material, maybe lithium disilicate or a metal

ceramic. Our choices should be based on patient requirement, the clinical scenario, and the budget.

To conclude, “knowing your zirconia” is about respecting its variants and matching them to their indications, knowing how to optimize it by modifying it as needed, and complementing it with other materials when they serve the patient better.



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