

## The venerable stainless steel crown

The stainless steel crown has been around about 50 years, give or take a few. Where would pediatric dentistry be without it? Dr. William Humphrey of Denver, Colorado, gets credit for developing and popularizing the crown around the world.<sup>1</sup> A few years ago, I had the opportunity to hear him tell the story of how it came to be. The birth of the stainless steel crown gives credence to the cliché "necessity is the mother of invention" because it ended years of frustration for dentists who were trying to treat extensive caries of the primary dentition.

As the story goes, for many years dentists caring for children had searched for a restorative solution to multisurface caries in the primary dentition. Amalgam was the mainstay, but could only do so much; when a tooth became more amalgam than hard tissue, failure was inevitable. Only the very rich could afford a gold crown or a Willett inlay.<sup>2</sup> Orthodontic bands filled with amalgam were a last resort when little tooth structure remained above the gingiva, but this technique provided little form or retention.

It may have been the orthodontic band that provided the idea for the crown of the same material. Dr. Humphrey's relationship with the Rocky Mountain Orthodontic Company provided him an opportunity to see the bands made. A small piece of steel was placed over a die that vaguely resembled a tooth and the die's form was impressed into the metal, creating something looking like a small tin can. All but the most gingival portion was discarded as the orthodontic band was severed from the primordial crown. Dr. Humphrey began to work with some of the precut blanks to restore teeth. The first crowns looked like something out of the wild West, resembling used shell casings rather than the anatomic contoured and festooned versions we have today! Over the years, the crowns have been shortened and some anatomy added, but the original concept has remained the same. Various manufacturers have changed the alloy and added other features to improve function, but the venerable crown is not all that different than it was a half century ago.

And what a half century of service these crowns have given the children of the world! To see the difference the crown has made in facial form, look back at some old photos of children whose primary molars had decayed to the gingiva or been extracted. And how many malocclusions as the result of space loss have been prevented by pulpal therapy and stainless steel crowns? Consider the smiles made possible with open-faced crowns. Those dentists who have been around

long enough to have seen the evolution of anterior primary restorations from silicate to complicated Class III paint-on acrylic to polycarbonate crowns to the composite strip crown, can appreciate that through all the changes, the open-faced stainless steel crown has been there, providing a reliable alternative when all else failed. It's fitting that the latest addition to the primary anterior armamentarium, the veneered stainless steel crown, still relies on the old standby!

The stainless steel crown has not been without some controversy and criticism. It's the whipping boy of the critics of overtreatment in pediatric dentistry who think amalgam will do. (Had they been there 50 years ago, perhaps it would have been exalted rather than blasphemed.)

Mastery of the crown continues to elude thousands of graduating dentists every year who, as a result of their discomfort, shy away from it and rely on huge amalgams to restore primary teeth. (Many of these teeth, if not extracted, eventually do end up with a stainless steel crown.)

Over these 50 years we've accused it of many things, including allergenicity and gingival irritation, called it ugly, soldered all kinds of wires and gizmos to it for one reason or another and argued about whether its margins should stay above or extend below the gingiva. In spite of it all, the crown has continued to serve us and our patients well; it's hidden the inadequacy of our preps and saved millions of teeth. Looking back on the many restorative techniques that have come and gone, it's hard to find a match for the stainless steel crown. It's easy to do, lasts as long as the tooth, doesn't leak or break, and fits just about every tooth. Just about the only thing it doesn't do is cost less. (Had we the benefit of hindsight, we would have been better off charging less for crowns than two-surface amalgams to encourage their use and acceptance!)

Gold has its cost, amalgam its controversy, and plastic its limits. Maybe the success of the stainless steel crown has been that it never claimed to be more than it is, yet when called upon to do more, responded so well.

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1. Allen WE: Stainless steel: its use in pedodontics. *Dent Clin North Am* 10:357-63, 1966.
2. Sim JM, Finn SB: Operative dentistry for children. In *Clinical Pedodontics*. SB Finn, ED, 4th Ed., Philadelphia: WB Saunders, 1973, pp. 135-67.