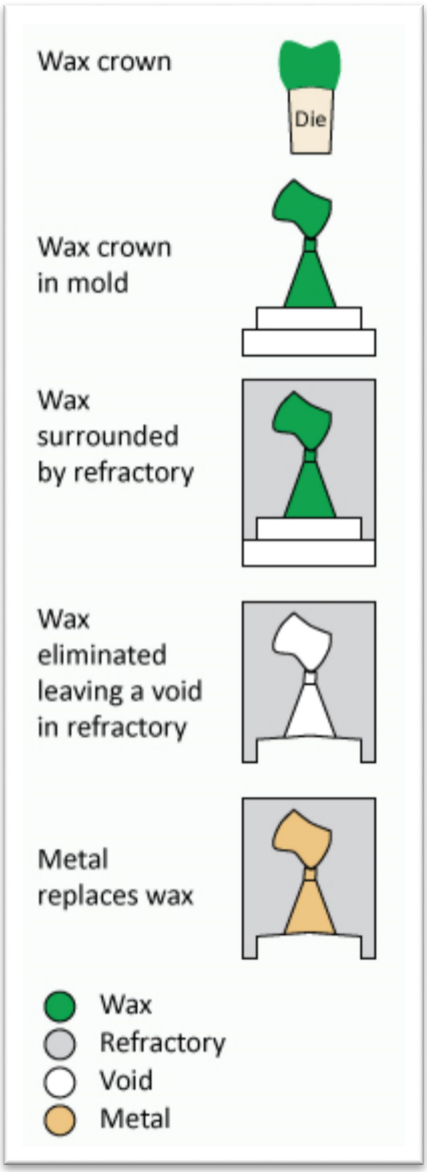
What's the difference between cast metal crowns and milled metal crowns?

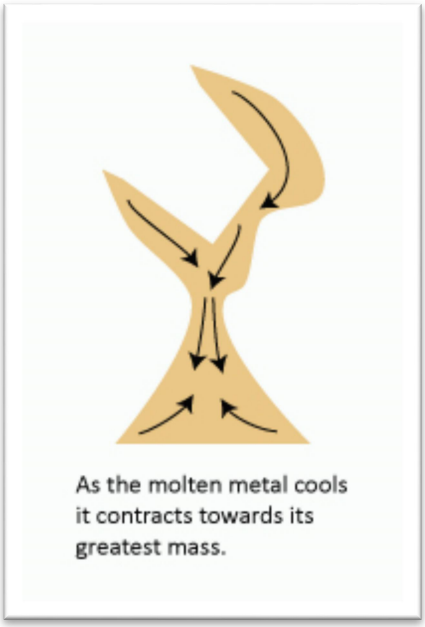
Cast—

- Part first made in wax
  - can be affected by atmospheric conditions
- Part set in mold of refractory
  - Final fit can be affected by atmospheric conditions or improper mixing of refractory
- Mold heated in furnace to eliminate wax
  - One chance to have a successful casting or back to square one
- Metal melted in casting machine
  - Torch, induction, broken-arm - each has its challenges
- Hot mold added to casting machine
- Molten metal is forced into the hot mold
- Metal and mold cool at the same time, but at different rates
  - Metal conducts- refractory insulates — Difficult to control cooling
- The rate of cooling of the metal affects physical properties of the alloy
  - Many variables are involved - very difficult to control all consistently
- The cast crown now needs cutting, minor contouring, smoothing, and polishing
  - 20-30 minute process with many opportunities for causing damage to the final product
- Reduction in size from previous step must be accounted for by oversizing the original wax
  - This complicates accurately adjusting interproximal and occlusal contacts, and maintaining complete marginal integrity



As molten metal cools it contracts. The rate at which it contracts determines the grain structure of the metal, which in turn determines the physical properties of the metal.

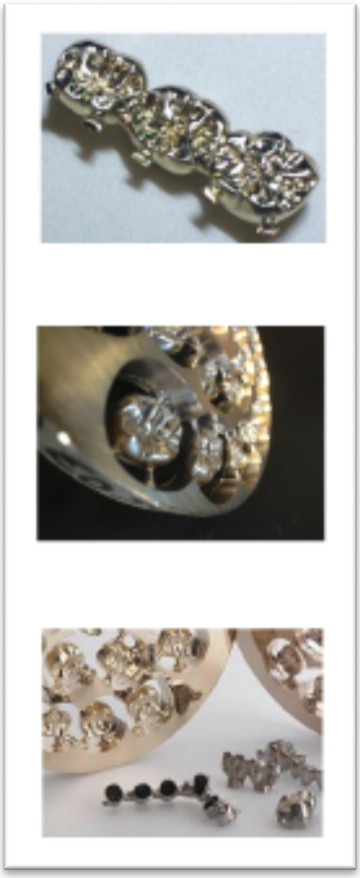
When casting a crown which has a varied thickness, the molten metal will be cooling at different rates leading to inconsistency in metal properties between thinner and thicker areas of the crown. This causes areas of brittle metal or porous metal which can lead to failure at delivery.



As the molten metal cools it contracts towards its greatest mass.

Milled—

- Scan impressions of prepared tooth
  - 3Shape, Carestream, Medit, Planmeca, for example
- Submit case to lab
  - Virtual model die and crown are designed and requested crowns are milled to exact dimensions to the micron - highly accurate
- Receive crown from manufacturer
  - Parts are drop shipped directly to doctors office
- Polish crown
  - 10 minute process - amount of size reduction is microscopic-no need to over-size the design
- Deliver to patient
  - They just fit



Every one of the variables that make the casting method so difficult is completely removed from the process in the milling method. The metal doesn't need to change states from liquid to solid; therefore its physical properties don't change.

Milled crowns are cut from a solid puck of gold dental alloy. The pucks are manufactured to exhibit consistent physical properties throughout the entire puck. Therefore the metal in the thin areas of the crowns exhibit the exact same physical properties as the thick areas. This means the whole crown will polish to the same lustrous shine and all margins will be consistently malleable. Milled crowns are much more accurately manufactured meaning the custom fit to the tooth will be more intimate meaning less chance for problems.

Based on the factors outlined here a milled gold crown is far superior to a cast gold crown. Gold finally gets an upgrade! Now it's better than ever.

Tom Mappin

Easy Gold Crowns