

## Problems Solvers 50 Inlays, Onlays and $\frac{3}{4}$ crowns Oh My! Synonyms: Inlays, Onlays, $\frac{3}{4}$ Crowns, $\frac{7}{8}$ crowns

When people have a cavity or a large filling there are times when a full crown is not the best choice for a restoration. When crowns are performed they require that the tooth be reduced 360 degrees around the tooth so that the entire tooth can be covered. The crown procedure can be a bit aggressive at times and if there is some well supported tooth structure it may be better to consider a partial crown. This problem solvers will discuss different types of restorations known as inlays, onlays and  $\frac{3}{4}$  crowns.

### Definitions:

An inlay is a filling that is made in the dental laboratory and then cemented into the tooth after it is fabricated outside the mouth. Inlays are most often made of gold or porcelain and are not able to be made out of Zirconia.

An Onlay is similar to an inlay, but what distinguishes it from an inlay is that an inlay sits within the remaining tooth structure but the onlay sits on top of part of the remaining tooth. This onlay will cover part or all of a cusp so that half the tooth may be restoration and the other half will be natural tooth structure.

A  $\frac{3}{4}$  or  $\frac{7}{8}$  crown is an almost full crown. It covers the majority of the tooth but there is still a wall or walls of tooth that are solid and healthy and the dentist will construct this restoration around this sound tooth structure.

The  $\frac{3}{4}$  crown covers  $\frac{3}{4}$  of the tooth and  $\frac{7}{8}$  crowns cover –yes you guessed it,  $\frac{7}{8}$ 's of a tooth. It is similar to a very big onlay. Full crowns cover the entire tooth and partial crowns are designed to leave as much healthy tooth structure as possible.

### **When would a situation call for the use of an inlay?**

Inlays are more exacting as they can be made under a microscope either via casting in gold, fabricating in porcelain or milling in zirconia. The ability to design these restorations, process them and check every step under a microscope can allow the fit and bite to be superior to a chairside filling.

### **What are the advantages and disadvantages of an inlay or onlay?**

An inlay and onlay is superior to a normal large amalgam or composite restoration in many ways. Inlays and onlays are cemented passively so they do not provide as much pressure on a tooth as a regular filling. These restorations provide better resistance to biting forces, they fit better (better marginal integrity), and they are more resistant to recurrent decay due to their superior fit.

Another advantage of restorations made in the laboratory, are the improvement over the contours of the restoration. Because they are made indirectly the angles of the restorations and the contacts to the teeth next door can be optimized for better gum tissue responses and improved cleaning.

Large fillings have been known to reduce the strength of a tooth by up to 60%, inlays and onlays can actually improve a tooth's strength up over a large filling by up to 75% it's original strength.

A disadvantage to inlays, onlays and  $\frac{3}{4}$  crowns in the short term is the cost however, when you realize that this restoration can outlast a large filling by 10 years or longer it may be a more cost effective option! Large fillings may need to be replaced every 3-7 years, and then they may require a crown. If that same tooth received a precision fit restoration like an onlay or  $\frac{3}{4}$  crown, it may have the same longevity as the crown without paying for the interim fillings. So better dentistry may be more expensive but it may allow the dentist to grind less on your tooth in order to be more conservative!

**When would I need to get an onlay or  $\frac{3}{4}$  crown?**

**Then the width of your filling is greater than 50% of the width of your tooth it is greatly weakened. In those instances a precision indirect restoration is a better choice.**

If a dentist removes all the old filling and decay and looks at your tooth they have to evaluate how much sound tooth structure is left. If a cusp is missing or the size of the filling leaves a thin wall of tooth structure then a larger filling like an onlay or  $\frac{3}{4}$  crown will splint together the remaining tooth and provide more optimal chewing.

Onlays and  $\frac{3}{4}$  crowns are just like crowns but they are more conservative. In dentistry we do not have replacement materials to match the beauty and strength of enamel. So whenever a dentist can preserve tooth they are performing less trauma and still improving the tooth to the best of their ability. Inevitably it is up to your dentist and their care, skill and judgement to determine when these restorations should be selected.

What is the advantage of a  $\frac{3}{4}$  crown?

When people have difficult shades of teeth to match a  $\frac{3}{4}$  crown can leave the front of the tooth intact and still cover the remaining tooth. This can create a more esthetic crown then trying to match the maverick color of the existing tooth.

**What are the differences between having a gold, porcelain, and composite resin inlays or onlays?**

The advantage porcelain inlays or onlays have over gold inlays or onlays are the cosmetic beauty of the white, porcelain fillings. However, porcelain has the disadvantage of being more brittle and more likely to break or chip than indirect fillings made of gold.

Additionally, porcelain has been known to cause accelerated wear of the opposing teeth. Gold restorations are more kind to the opposite teeth and are always thought of as the gold standard of fillings.

In recent years, newer types of porcelains have been developed that seem to rival the longevity of gold and provide much better wear against opposing teeth.

Inlays and onlays can be constructed in composite resin. This is tooth colored and is usually pressure cured in the dental laboratory to give it optimum strength. There are less long term studies regarding composite, but initial findings suggest that it has a similar lifespan to porcelain inlays or onlays. Many dentists like composite inlays and onlays because they are much less abrasive than porcelain and therefore kinder to the opposing teeth. They are also easier to repair in the mouth with traditional filling materials.

Many people do not want to spend the extra money for a laboratory-fabricated composite, as they are similar in cost to porcelain so many choose the porcelain materials.

What types of fillings do most dentists have in their mouths?

All of my fillings are gold. Most of my colleagues choose gold restorations and most women choose porcelain based upon my practice numbers. I discuss all types of restorations with my patients and they may choose whichever they feel will serve their cosmetic and functional needs the most within their budgets.

When are gold inlays and onlays indicated?

When people want a restoration that will last the longest they will select gold. This is a restoration that is smooth, bacteria resistant, kind to the opposing teeth and it will get better with age. The malleability of the gold makes the margins get smoother and smoother as this restoration ages so they last the longest of all restorations. My grandfather and father were dentists and they both have patients that have gold restorations from their generations that look like they were placed yesterday. This is quite a feat given the forces and acids that teeth are subjected to everyday.

How are these inlays and onlays and  $\frac{3}{4}$  crowns made?

After the dentist prepares the tooth and insures that the remaining tooth structure is sound and healthy an impression is made of the tooth and sent to a laboratory or to a milling machine. The patient will then receive a temporary and go home or they will have the

restoration made at their milling station. In the case of a gold restoration the impression is poured up in dental stone and a wax pattern of the inlay is made. Next it is put into a casting machine using a method called the lost wax technique where molten gold is centrifuged into a stone block where the wax pattern had been embedded. After breaking the gold restoration out of the stone it is carefully finished and polished.

Then the restoration is carefully inspected, tried in to the patients' mouth and cemented using dental cement.

In the age of dental HMO's and PPO's where most patients are not given a choice it is nice to know there are still restorations that people can choose if they want to upgrade their dental experience.

The use of precision restorations like onlays and  $\frac{3}{4}$  crowns can save drilling on teeth multiple times and can save the health care system millions of dollars a year. They can also preserve tooth structure and save patients money in the long term.

These are restorations that have been done for over a hundred years there's no reason to stop now!

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