COMPARISONS OF DIRECT RESTORATIVE DENTAL MATERIALS

TYPES OF DIRECT RESTORATIVE DENTAL MATERIALS				
COMPARATIVE FACTORS	PORCELAIN (CERAMIC)	PORCELAIN (FUSED-TO-METAL)	GOLD ALLOYS (NOBLE)	NICKEL OR COBALT-CHROME (BASE-METAL) ALLOYS
General Description	Glass-like material formed into fillings and crowns using models of the prepared teeth.	Glass-like material that is "enamaled" onto metal shells. Used for crown and fixed-bridges.	Mixtures of gold, copper and other metals used mainly for crowns and fixed bridges.	Mixtures of nickel, chromium.
Principle Uses	Inlays, veneers, crowns and fixed-bridges.	Crowns and fixed-bridges.	Cast crowns and fixed bridges, some partial denture frameworks.	Crowns and fixed bridges; most partial denture frameworks.
Resistance to Further Decay	Good, if the restoration fits well.	Good, if the restoration fits well.	Good if the restoration fits well.	Good if the restoration fits well.
Estimated Durability (permanent teeth)	Moderate; Brittle material that may fracture under high biting forces. Not recommended for posterior (molar) teeth.	Very good. Less susceptible to fracture due to the metal substructure.	Excellent. Does not fracture under stress; does not corrode in the mouth.	Excellent. Does not fracture under stress; does not corrode in the mouth.
Relative Amount Of Tooth Preserved	Good – Moderate. Little removal of natural tooth is necessary for veneers; more for crowns since strength is related to its bulk.	Moderate – High. More tooth must be removed to permit the metal to accompany the porcelain.	Good. A strong material that requires removal of a thin outside layer of the tooth.	Good. A strong material that requires removal of a thin outside layer of the tooth.
Resistance to Surface Wear	Resistant to surface wear; but abrasive to opposing teeth.	Resistant to surface wear; permits either metal or porcelain on the biting surface of crowns and bridges.	Similar hardness to natural enamel; does not abrade opposing teeth.	Harder than natural enamel but minimally abrasive to opposing natural teeth, does not fracture in bulk.
Resistance to Fracture	Poor resistance to fracture.	Porcelain may fracture.	Does not fracture in bulk.	Does not fracture in bulk.
Resistance to Leakage	Very good. Can be fabricated for very accurate fit of the margins of the crowns.	Good – Very good depending upon design of the margins of the crowns.	Very good – Excellent. Can be formed with great precision and can be tightly adapted to the tooth.	Good – Very good – Stiffer than gold; less adaptable, but can be formed with great precision.
Resistance to Occlusal Stress	Moderate; brittle material susceptible to fracture under biting forces.	Very good. Metal substructure gives high resistance to fracture.	Excellent	Excellent
Toxicity	Excellent. No known adverse effects.	Very Good to Excellent. Occasional/rare allergy to metal alloys used.	Excellent; Rare allergy to some alloys.	Good; Nickel allergies are common among women, although rarely manifested in dental restorations.
Allergic or Adverse Reactions	None	Rare. Occasional allergy to metal substructure.	Rare; occasional allergic reactions seen in susceptible individuals.	Occasional; Infrequent reactions to nickel.
Susceptibility to Post-Operative Sensitivity	Not material dependent; does not conduct heat and cold well.	Not material dependent; does not conduct heat and cold well.	Conducts heat and cold; may irritate sensitive teeth.	Conducts heat and cold; may irritate sensitive teeth.
Esthetics (Appearance)	Excellent	Good to Excellent	Poor – yellow metal	Poor – dark silver metal
Frequency of Repair/ Replacement	Varies; depends upon biting forces; fractures of molar teeth are more likely than anterior teeth; porcelain fracture may often be repaired with composite resin.	Infrequent; porcelain fracture can often be repaired with composite resin.	Infrequent; replacement is usually due to recurrent decay around margins	Infrequent; replacement is usually due to recurrent decay around margins.
Relative Costs To Patient	High; requires at least two office visits and laboratory services.	High; requires at least two office visits and laboratory services.	High; requires at least two office visits and laboratory services.	High; requires at least two office visits and laboratory services.
Number of Visits Required	Two – minimum; matching esthetics of teeth may require more visits.	Two – minimum; matching esthetics of teeth may require more visits.	Two – minimum	Two-minimum