Invisible Orthodontics

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Introduction :

Recent advances in material science and technology has resulted in an array of newer arch wire materials, newer esthetic brackets opening new vistas in orthodontic treatment. Materials with widely diverging properties are on the market today and their usage has profound implications on appliance mechanics.

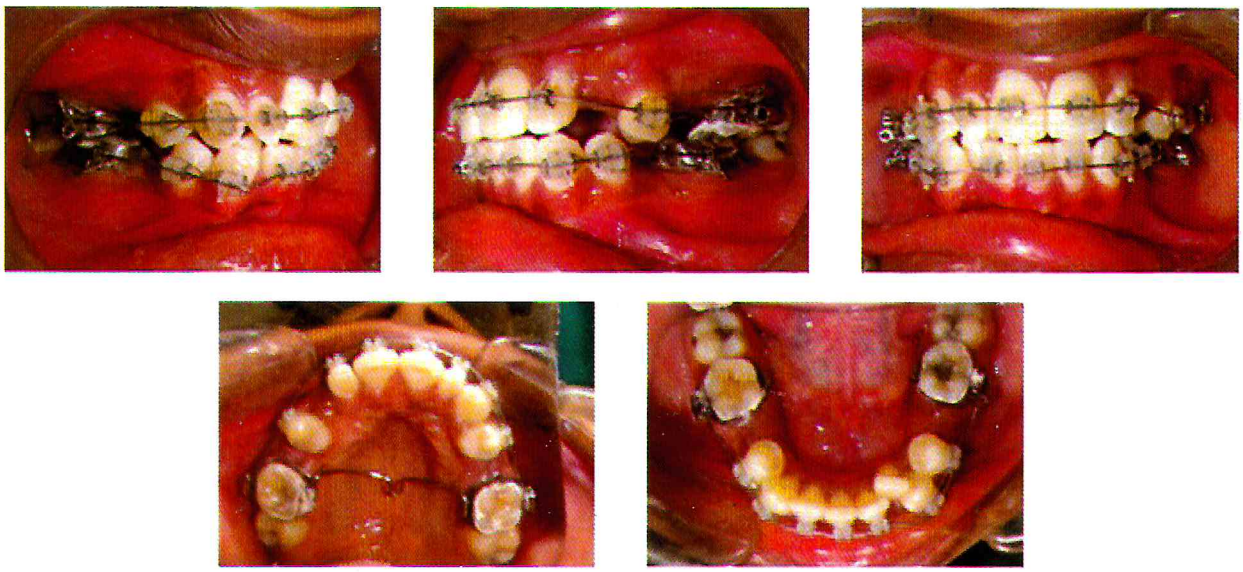
Aesthetics is purely and simply the science of expression, expression being itself so defined as to be identical with every form of Appreciation, Intuition or Imaginative Synthesis[1].

Through the influence of the media, esthetics and esthetic models have increasingly become points of reference for our relationship.

The "Invisible appliance terrain" definitely draws inspiration from Hans Christian Andersens legendary fable where an emperor with a fetish for haute couture spends a fortune on nothingness and truly invisible attire to flaunt [1].

1. CERAMIC BRACKETS: In the mid 1980s, the first bracket made of monocrystalline sapphire and polycrystalline ceramic materials came into the field of orthodontics [2,3].

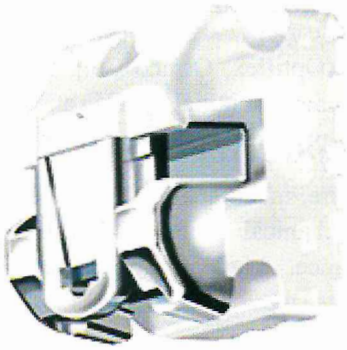
- They were introduced as an esthetic appliance which, unlike plastic brackets could withstand most orthodontic forces and resist staining.
- Ceramic brackets are two types: polycrystalline ceramic brackets and mono crystalline ceramic brackets.
- The most apparent difference between polycrystalline brackets and mono crystalline brackets is in their optical clarity.



Intra Oral Photographs With Ceramic Brackets.

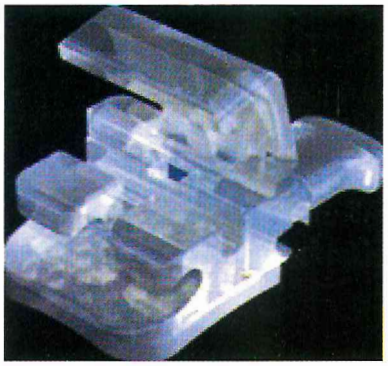
2. SELF LIGATING BRACKETS :

Intra oral photographs showing clarity (3m) ceramic brackets with aesthetic arch wire.

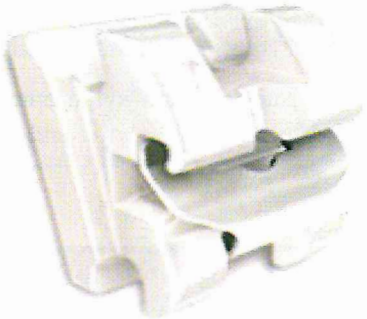


Damon MX

Ultradent Opal



Oyster SLB



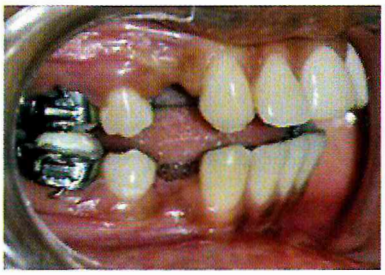
Inovation C Bracket

Phantom Lingual Self Ligating Bracket

3. LINGUAL ORTHODONTICS :

- Lingual orthodontics is nowadays a well recognized discipline in the light of growing demand for esthetics by patients[1].
- Lingual techniques give more than satisfactory results when treating all kind of malocclusion.
- Pleasant esthetic look increases people's self confidence and provides reassurance when making personal contact.



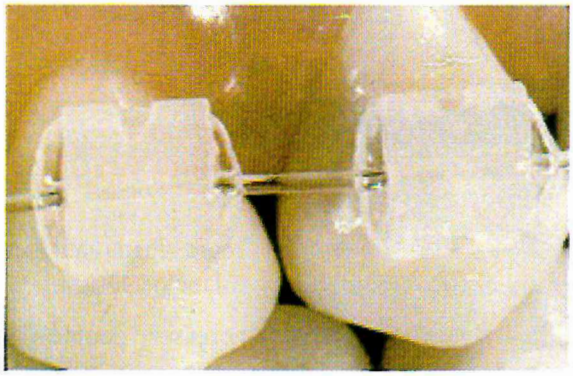


3. PLASTIC BRACKETS :

- **Morton Cohen and Silverman introduced the first commercially available plastic brackets (IPB brackets),manufactured by GAC in 1963.**
- **The first plastic brackets were manufactured from unfilled polycarbonate and esthetics was their main advantage.**
- **Pure plastic brackets lack strength to resist distortion and breakage, wire slot wear, uptake of water, discoloration and the need for compatible resins.**

4. ESTHETIC ARCH WIRES :

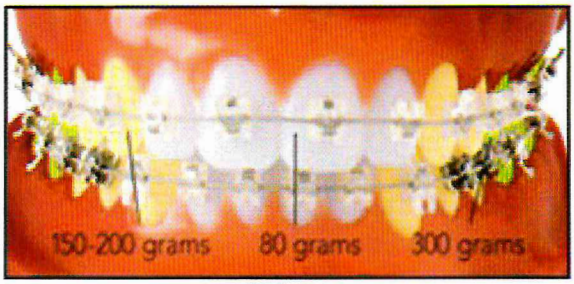
One of the earliest versions of esthetic arch wires consisted of a tooth coloured plastic coating around the wire; the wire had a pleasing appearance but in time stained and the surface cover split revealing the underlying metal.

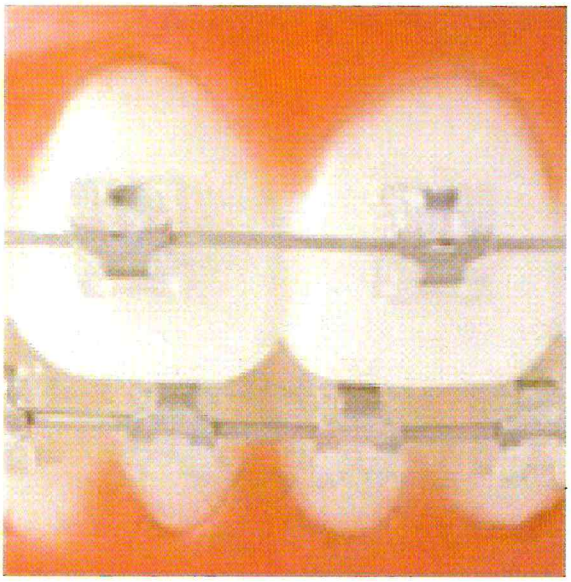


I) **A "Totally esthetic labial arch wire (TALA)[4]"**

- It was introduced to clinical orthodontics by Talass in 1992 .
- It was made of clear optical silicon fiber, comprised of three layers (Optiflex, Ormco Corp., Glendora, CA) and proved ideal for initial leveling and aligning. Optiflex showed practically no deformation.
- Optiflex arch wire, manufactured by Ormco- It has got unique mechanical properties with a highly esthetic appearance. Made of clear optical fibre, it comprises of three layers.
  1. A silicon dioxide core that protects the core moving teeth.
  2. A silicon resin middle layer that protects the core from moisture and adds strength.
  3. A stain resistant nylon outer layer that prevents damage to the wire and further increases its strength.

II . BIO FORCE :

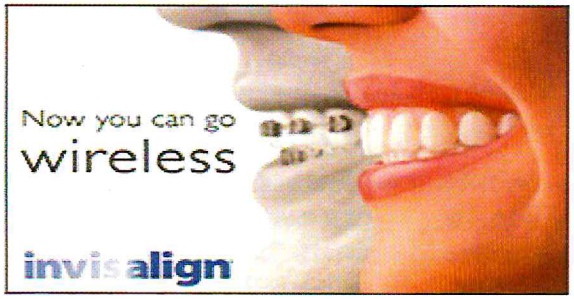




- GAC offers the BioForce® single-strand, superelastic, body-heat-activated archwire that starts with biologically correct, gentle forces for the anteriors, and then automatically increases in force at the posterior, where it plateaus in the molar region.

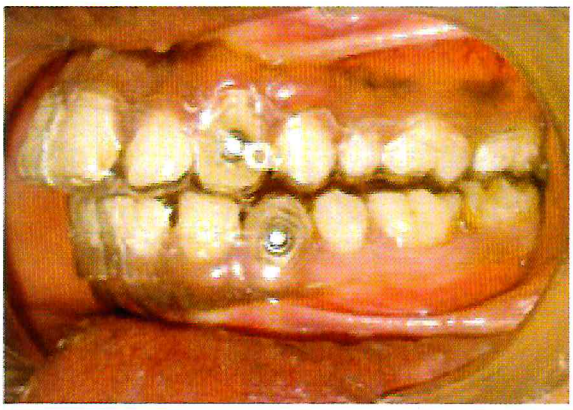
5. INVISALIGN:

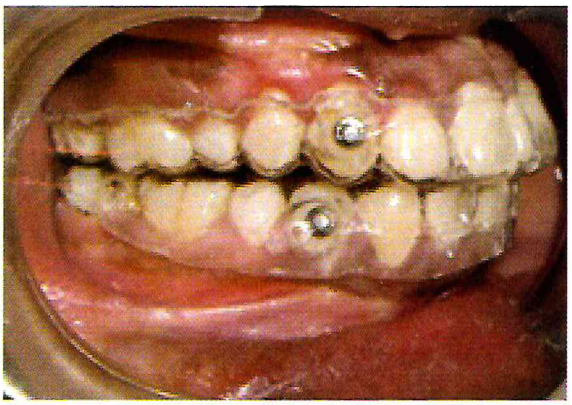
- **Kelsey Wirth and Zia Chishti**, two MBA students from Stanford University, founded Align Technology in **April 1997**.

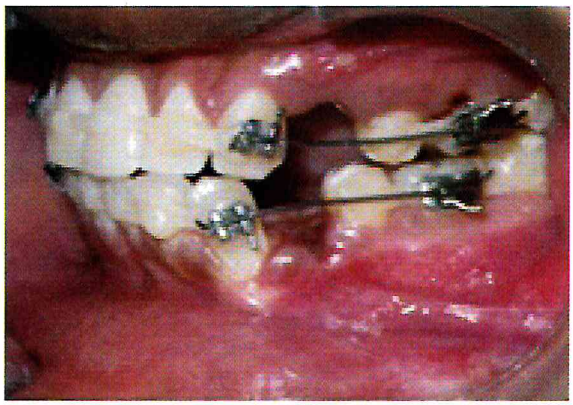


- Invisalign is the invisible way to straighten teeth without braces. Invisalign uses a series of clear, removable aligners to gradually straighten teeth. [5,6]
- Aligners are made of clear, strong medical grade plastic that is virtually invisible when worn.
- This innovative approach combines orthodontic principles with 3 dimensional computer and mass-customization technologies.
- A series of algorithm stages were produced to move teeth into 0.015-0.025 mm, successive precise movements using computer programmes that manipulate the virtual images of the individual malocclusion.

6. ESSIX RETAINERS:



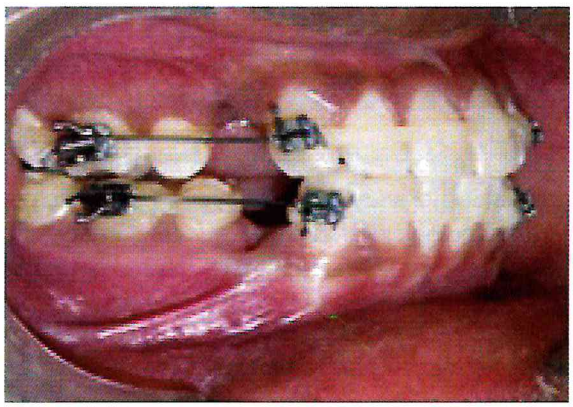




- First introduced in 1993.
- It's a plastic removable device [7] that snaps over the teeth and for all practical purpose, is invisible.
- It's inexpensive and can be quickly fabricated. Minimal bulk with sufficient strength.
- Retentive without clasps.
- Usually requires no adjustment
- Does not interfere with speech, efficiency of the occlusion and function

Mainly used for

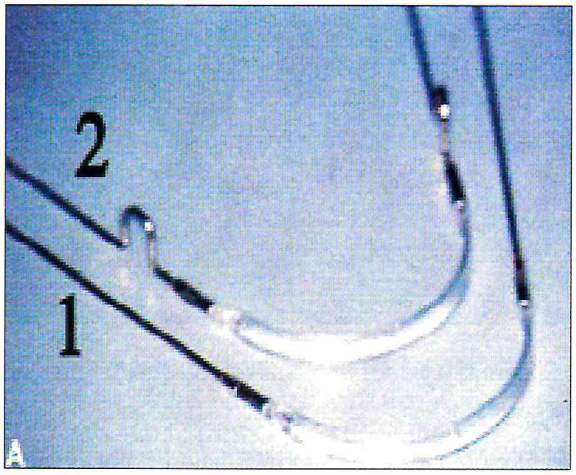
- Closing the reopened extraction space.
- Bite planes.
- To intrude excessively erupted teeth.

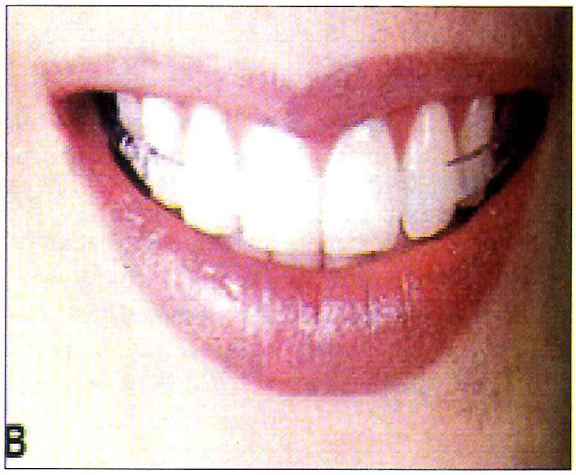


7. FIBER REINFORCED COMPOSITE STRIPS

- Burstone and Kuhlberg [8] have described the clinical application of a new fiber reinforced composite called "Splint-It" which incorporates S2 glass fibers in a BIS GMA matrix.
- This is available in various configurations such as rope, woven strip and unidirectional strip.
- Made of S glass fibres in a matrix of thermo set BIS-GMA.The FRC rope or strip is cut to length, and the protective transparent foil is gently removed.
- They can be applied for various purposes such as post treatment retention, as full arches or sectional arches and to reinforce anchorage by joining teeth together
- Long-fiber composites can be used as adjuncts for active tooth movement.
- The tooth is prepared for bonding with conventional polishing and etching.
- The FRC is placed in position and contoured to the tooth, then light-cured to form an effective connecting bar.

Organic Polymer Wire (QCM)





- Organic polymer retainer wire made from 1.6mm diameter round polytheline terephthalate [9].
- Patients who have worn aesthetic ceramic or plastic brackets during orthodontic treatment are likely to want aesthetic retainers after treatment, so these wires are used for aesthetic maxillary retainers.

Marsenol

- Marsenol is a tooth coloured nickel titanium wire. It is an elastomeric poly tetra fluroethyl emulsion (ETE) coated nickel titanium.
- It exhibits all the same working characteristics of an uncoated super elastic Nickel titanium wire. The coating adheres to wire and remains flexible.

REFERENCES :

1. Gisuppe Scuzzo: Invisible orthodontics:Current concepts and solutions in lingual orthodontics.
2. Winchester .Bond strengths of five different ceramic brackets: An in vitro study. Eur J Orthod 1991;13:293-305.
3. Harris A, Joseph , Rossouw . Shear peel bond strengths of esthetic orthodontic brackets . Am J Orthod Dentofac Orthop1 1992; 102;215-219.
4. Tallas MF . Optiflex archwire treatment of a skeletal class III open bite. J Cli Orthod 1992 ;26;245-252.
5. Boyd , Miller , Vlaskalic:The Invasign system in adult orthodontics: mild crowding and space closure cases . J clin orthod 2000 ;34:203-212.
6. Boyd RL : Esthetic orthodontic Treatment using the Invasalign appliance for moderate to complex malocclusions. Journal Of Dental Edu: 2008, Vol 72(8) 948-967.
7. Sheridan, McMinn, Ledoux: Essix thermosealed appliances :various orthodontic uses. Journal of clinical orthodontics:1995;29;108-113.
8. Abhishek agarwal ,D.K Agarwal:Newer orthodontic wires: Revolution in orthodontics. Orthodontic cyber journal .Apr,2011.
9. Watanabe M, Nakata S, Morishita T. Organic polymer wire for aesthetic maxillary retainers. J Clin Orthod 1996; 30: 266-71.