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# CHEMICAL COMPOSITION OF TITANIUM PREFORMED ORTHODONTIC ARCHWIRES - A PRELIMINARY REPORT.

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**INTRODUCTION:** In 1979, Burstone and Goldberg introduced orthodontic wires made from the Titanium Molybdenum alloy. Since March 1999, their patent has run out and such wires are now freely available on the market from several suppliers.

**MATERIALS:** Orthodontic rectangular (.017 x .025 inch) preformed archwires were obtained from 9 major firms, namely :

- **Beta Titanium™ (American Orthodontics®)**
- **Rematitan® de Dentaurum®**
- **Resolve® de GAC®**
- **Betablue™ de Highland Metals®**
- **TMA® et TMA Low Friction® de Ormco®**
- **Beta Plus™ de Ortho Plus®**
- **Bendaloy™ de RMO®**
- **TiMolium™ de TP Orthodontics®**
- **Beta III Titanium™ de 3M Unitek®**

One wire of each brand was chosen at random to be tested.

## PRELIMINARY FINDINGS:

The metal contents of 8 brands of archwires presently available are closely related, with

*approximately Titanium 80% / Molybdenum 11%.*

Such alloys are comparable to the original metal-combination developed by Burstone and Goldberg in 1979 which contained

*Titanium 79% / Molybdenum 11% / Zirconium 6% / Tin 4%*

**Betablue™** has less Molybdenum (approximately 4%).

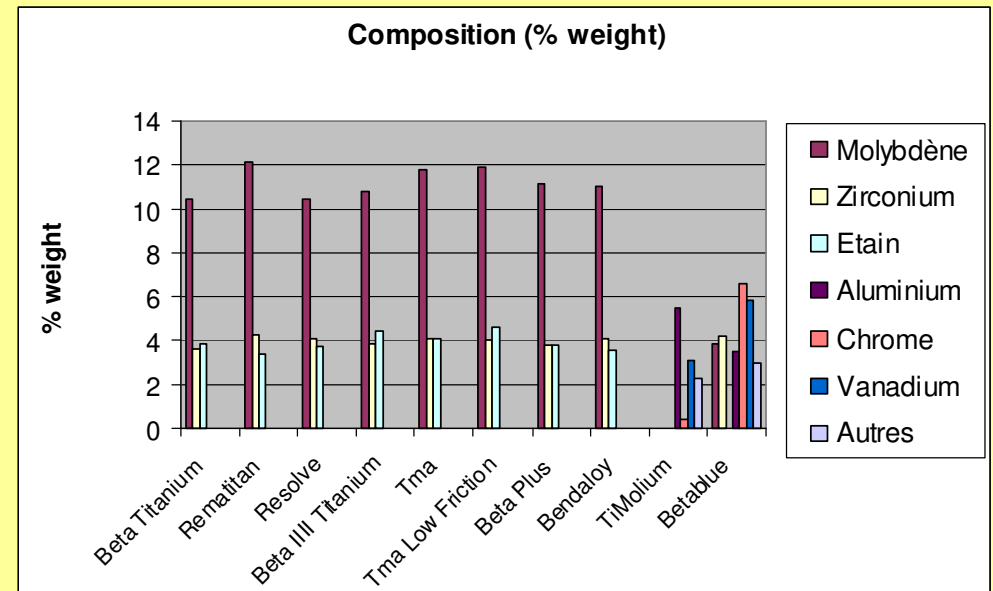
**TiMolium™** contains more Titanium (close to 90%) and no Molybdenum.

Metals such as **Aluminium**, **Vanadium** and **Chrome**, have also been found.

**METHOD:** The chemical composition of the alloy making up each sample was established by means of electronic microscopic analysis with an Energy Dispersive Spectrometer (EDS). This proved sufficient for 8 out of the 10 sample archwires put to test.

Additionally, Cameca SX 100 microprobe (Wavelength Dispersive Spectrometer WDS) was used to complete the chemical analysis of the 2 remaining samples, where the presence of other metals had been found).

## RESULTS (Except % Titanium)



## CONCLUSION:

The metal composition of Titanium archwires currently available for orthodontic treatment may vary. Some appear to be quite different from the original B-Titanium alloy.

*Further investigation is presently under way.*