

## NICKEL TITANIUM ALLOYS IN ORTHODONTICS. NEWS, VARIETIES, USE

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### BACKGROUND

Nickel-titanium alloys are "smart" intermetallic materials, defined by 2 notions:

- with shape memory effect (SMA)
- superelastic (SE).

### AIM

To evaluate the medico-technical qualities, varieties and use in orthodontics.

### MATERIAL AND METHODS

The study of the literature with reference to orthodontic biomaterials and the catalogues of the manufacturing companies revealed that Ni-Ti alloys are of choice in making superelastic and SMA orthodontic wires, springs, clips of some self-ligating brackets.

### KEYWORDS

Ni-Ti alloy, orthodontic wire, superelastic effect, shape memory effect.

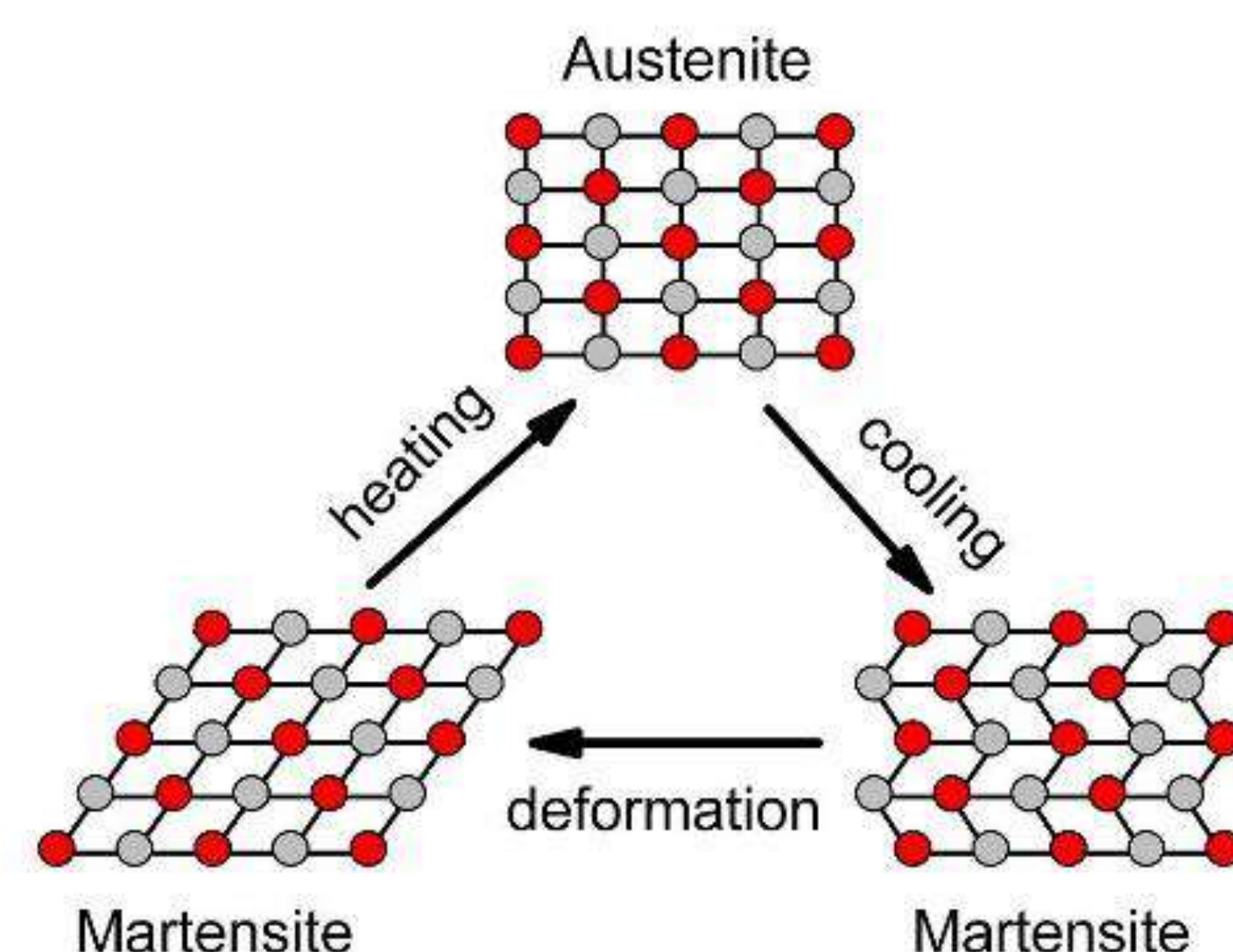


Fig.1. Nitinol's crystalline structure during cooling/heating cycle

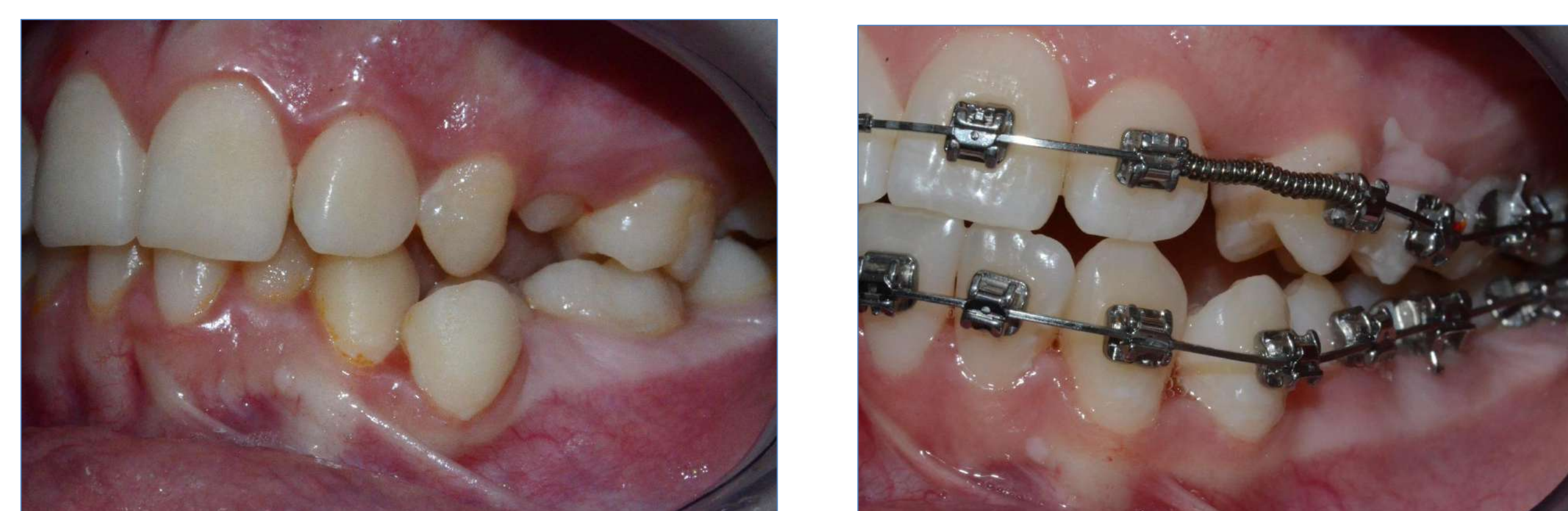


Fig.2. Clinical case, BioQuick MBT .022, NiTi open-coil medium pull



Fig.3. Clinical case, 2 months, 9 months Ni-Ti SE and SMA wires

### RESULTS

The Ni-Ti wires were classified according to:

- the effect produced  
similar to rubber, shape memory, superelastic;
- the force produced  
austenite, martensite, stabilized.

#### **Superelastics:**

Rematitan; DuoForce CuNiTi, Titanol Triple Force; Nanda Braided CuNiTi; NT3 SE NiTi; Nitinol SE; TruFlex NiTi; CuNiTi 27°C, etc.

#### **Thermo-active, SMA-effect:**

Tensic, Equire - thermo-active; BioStarter; Therma-Ti, TriTanium Memory Wire; Neo-Sentalloy; Tru-FlexThermal Ni; CuNiTi 40°C.

### CONCLUSIONS

The Ni-Ti alloys are found in orthodontic treatment in the form of wires used for the alignment and leveling of dental arches, springs for closing/opening interdental spaces, easily maneuverable clips in self-ligating brackets.

The shape memory effect allows the deformed wires to return by heating - martensitic transformation (equal to that of the body).