

Dental Arch Wire

Straightening teeth is an arduous process requiring months, often years, of applying corrective pressure by means of arch wires—better known as braces—which may have to be changed several times in the course of treatment. A new method has been developed by Dr. George Andreasen, orthodontist and dental scientist at the University of Iowa. The key is a new type of arch wire material, called Nitinol, with exceptional elasticity which helps reduce the required number of brace changes.

An alloy of nickel and titanium, Nitinol was originally developed for aerospace applications by the Naval Ordnance Laboratory, now the Naval Surface Weapons Laboratory, White Oaks, Maryland. NASA subsequently conducted additional research on the properties of Nitinol and on procedures for processing the metal.

In installing the brace, the orthodontist must bend the wire to attach it to out-of-line teeth. When bent, the customarily-used stainless steel wire tends to kink and lose its ability to exert pressure, necessitating frequent

adjustment and sometimes a complete brace change. Nitinol has the ability to return to its original shape after bending; it does not kink but continues to pull on the teeth. The comparison photos at the bottom of the page illustrate the alloy's advantage over stainless steel. The arch wire in the left photo is stainless steel, bent once and released; the arch line is irregular. In the right photo is a Nitinol arch wire bent and released 100 times; it still maintains its original shape.

Dr. Andreasen has used Nitinol wire in treatment of many patients and he has found that in some instances the same wire arch can be used for the entire treatment. Patients report less discomfort and in certain cases the continuous pulling effect afforded by Nitinol's elasticity has reduced the frequency of office visits and trimmed overall treatment time. The orthodontic application of Nitinol represents a decade of development by Dr. Andreasen, who was provided assistance by the Naval Ordnance Laboratory and by Unitek Corporation, Monrovia, California. Unitek is now producing several types of Nitinol wire for orthodontic use under the trade name Activ-arch.

