Atraumatic restorative treatment (ART) is a minimally invasive method of treatment of dental caries that uses only hand tools. ART was originally developed in Tanzania in the 1980’s as part of an oral health program, created by the need to find a method of teeth preservation in people of all ages from disadvantaged communities, where resources like water, electricity and conventional dental equipment were rarely available.

**Keywords**: atraumatic restorative treatment, glass ionomer cement, non-invasive technique.

Atraumatic restorative treatment (ART) is an alternative treatment for tooth decay. It was originally developed for use in underdeveloped countries, in rural areas, because it requires no anesthesia or electricity. A recent study showed improvement in oral health of temporary and permanent dentition in children having received ART in mobile dental clinics [1].

The ART principles are:
1. removal of carious tooth tissue using only hand tools
2. restoration of the cavity with a high-viscosity glass-ionomer, along with concurrent sealing of the adjacent pits and fissures [2].

Necrotic dentin is removed with sharp excavators. It is not necessary to remove all soft, minimum infected dentin near the pulp chamber if no signs of pulpitis are observed.

Recently, the increased interest in this technique was manifested also in developed countries, because of its “atraumatic” approach in relation to the stress and pain experienced by patients [3]. This minimally invasive procedure does not cause pain and is more readily accepted by children, so that ART has gained ground in developed countries for the management of early childhood caries [4].

In the underdeveloped countries, limited availability of dental care could be due to the lack of special training of dentists to treat children, their reluctance to treat children with Medicaid coverage or uninsured children. Unwillingness of people to seek services could be due to the high costs of treatments, lack of awareness and motivation, or some behavioral problems among children, such as fear and anxiety caused by dental procedures.

Nowadays, the ART technique is indicated in oral care of very young children, not previously exposed to dentistry, to very fearful and anxious patients or to patients with physical or mental disabilities, in high-risk caries clinics, as an intermediate treatment, to stabilize the existing conditions [5].

The ART approach has demonstrated a very high acceptance by children, and has also resulted in the retention of many teeth that otherwise would have been extracted [6]. It has been stated that 10%-20% of the adult population in the Western industrialized world report high dental anxiety developed during childhood [7,8].

ART is not a treatment of compromise, but a perfect alternative treatment, that conserves sound tooth tissue and causes fewer traumas to teeth [9].

Recently, viscous glass ionomers with improved physical properties, largely due to a smaller mean particle sizes [10,11] have been created for ART.
The survival of ART restorations depends on many factors, among which the number of restored surfaces and the viscosity of glass ionomers used. Studies have shown that ART restorations performed on the surface of temporary molars have the same survival rate compared to other restorations of the same type, realized with other techniques. Consequently, ART restorations can be considered the treatment of choice for caries on the surface of temporary molars. Lo et al. report a 6-year follow up of ART in China, concluding that smaller ART restorations survive longer than larger restorations [12]. Instead, the research has shown that ART restorations on multiple surfaces have a lower survival rate in temporary dentition than surface restoration [13].

Even with the new generation of glass ionomer, class II / multi-surface and class III / IV ART restorations have low success rates after 12 months, and only 14% of class III / IV ART restorations were considered as good after 30 months [14].

A study of van’t Hof has shown that high-viscosity glass ionomers survived longer than those with medium viscosity [15]. Kemoli’s study showed that survival was highest if cavities were restored 2-3 mm [16]. A study conducted by Frencken [17] concluded that 79% of single surface ART fillings and 55% of ART fillings on more than one surface placed in deciduous teeth were successful.

A meta-analysis conducted in 2011 by deAmorin et al. showed that, when comparing amalgam and ART restorations in primary teeth, no significant differences were noticed between them after 12 and 24 months [18].

ART restorations for class I cavities seemed to have a high success rate, indicating the appropriateness of using ART in primary teeth. The same authors concluded in a 2-year follow-up study that 90% of ART restorations were successful [19].

All in all, cavities restored using ART appear to be as effective as the one restored by conventional methods, most studies reporting no significant difference between them.

ART costs less than conventional restorations. Mickenautsch’s study found out that the annual capital cost of the ART approach was 50% less than the amalgam and composite resin restorative procedures in a modern dental setting [20].

ART today is no longer considered “third-world dentistry” or “dentistry out of Africa”, having the support of World Health Organization and FDI World Dental Federation. The main objective of study of Pan American Health Organization Organized Project PRAT was to demonstrate the cost-effectiveness of ART [21].

The World Health Organization recognizes ART as part of the package of oral health care for the community. It views ART as an innovative highly effective approach suitable for population at all levels of economic development which fits the modern concepts of preventive and restorative oral care, laying stress on prevention and minimally invasive restorative care [22].

Atraumatic restorative treatment, currently used in 25 countries, is part of the regular training programs for oral personnel in at least 3 countries [23]. Due to its effectiveness, it makes restorative treatment more accessible for all groups of population.

References


