***Type of manuscript:*** *Review*

# Atraumatic Restorative Treatment for Managing Dental Caries - A Review

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## Abstract

The study aims to create awareness about the newly developing atraumatic treatment and its benefits. Atraumatic restorative treatment is an alternative treatment that is used for the removal of caries using hand instruments only, so therefore no electricity or anaesthesia is required and the pain experienced is minimum. This technique is very useful for children, elderly, special needs patients and patients who feel fear and anxiety about dental treatment as in atraumatic restorative treatment that is more conservation of tooth structure, minimise in trauma and so there is reduced amount of pain due to small cavity preparations. Atraumatic restorative treatment is less painful and is more patient-friendly than that of conventional caries treatment. The fundamental instruments for ART are mouth mirror, explorer, pair of tweezers, dental hatchet, small and medium-size excavator, spatula, amalgam carrier/applier. ART uses only hand instruments for opening/enlarging the cavity and for removing carious tissue. The amount of carious tissue that should be removed depends mainly on the cavity depth. In cavities of shallow and medium depth, carious tissue is removed up to firm dentine. In deep/very deep cavities, in which there is no sign of pulp exposure, pulp inflammation and/or history of spontaneous pain, some soft dentine can be left in the pulpal floor/wall to avoid pulp exposure. This method of treatment is more useful for people in underexposed areas where they are also able to maintain good oral health.

***Keywords:*** *Atraumatic restorative treatment, instruments and material consideration, conventional treatment, the survival of ART, advantages of ART.*

## Introduction

Atraumatic restorative treatment is an alternative treatment that is used for the removal of caries using hand instruments only[1]so, therefore no electricity or anaesthesia is required and the pain experienced is minimum[2]. Originally atraumatic restorative treatment was created for the use in developing since it doesn't require electricity or sedation[3]. All the more as of late, Atraumatic restorative treatment has gotten progressively acknowledged in evolved nations due to its atraumatic approach compared to the pressure and torment experienced by patients [4,5]. This technique is very useful for children, elderly, special needs patients and patients who feel fear and anxiety about dental treatment as in atraumatic restorative treatment that is more conservation of tooth structure, minimise in trauma and so there is reduced amount of pain due to small cavity preparations.[6]

Atraumatic restorative treatment is less painful and is more patient-friendly than that of conventional Caries treatment.[7] Many researchers have shown that the ART approach is more effective in managing single surface cavities in both the deciduous and permanent teeth. There is no difference in survival rates between single surface

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atraumatic Restorative treatment restorations when compared to amalgam restorations in the permanent dentition[8]. The surface wear of ART reclamations utilising high consistency glass Ionomer following two years is slow. Workmanship sealants utilising High consistency glass Ionomer are held longer than ART sealants utilising low thickness glass ionomer following three years. ART consists of removing the decayed tissue using hand instruments and then restoring with a good adhesive material usually high viscosity glass ionomer cement[9]. Pain is absent so local anaesthesia is hardly needed and use of rotary instruments has minimised patients anxiety and discomfort. Studies have proved that ART is a more friendly approach when compared to other restorative treatments. The ART restoration took less time to be done than that of conventional treatment.[10]

Glass Ionomer cement, they are a constant trend in the market and they fulfil many functions and also in aesthetic requirements. They are inexpensive when compared to resin composite[11]. In Atraumatic restoration by powder to the liquid ratio we can get high viscous or condensable GIC, that has high mechanical properties as compared to traditional GIC that was developed for Atraumatic restorative treatment.[12] GICs the material of decision for ART because of its physical and synthetic properties. Such properties incorporate it's grip to dental structures, biocompatibility, substance set response and fluoride discharge-take up which adds to GICs preventive character. One of the significant downsides of GIC is the moderately low crack quality and higher occlusal wear rate in contrast with amalgam and present composite material[13]. Recent clinical trials have proven that single surface ART restoration using high-velocity GIC in both primary and permanent dentition has a higher survival rate than that of medium viscosity GIC Casein phosphopeptides (CPP) stabilize amorphous calcium phosphate (ACP), localize ACP in dental plaque[14]. Calcium phosphopeptides help to remineralise surface lesions in enamel[15]. Dental erosion is caused by acid attacks, either from extrinsic sources such as consumption of acidic beverages, occupational acid exposure such as wine tasters, and workers from battery industries or intrinsic sources of reflux of gastric acid into the oral cavity in conditions such as gastroesophageal reflux disease, anorexia nervosa, and bulimia.[16]

The standards of the ART strategy are not new. One of the foundations of the customs administration of a patient with various caries sores is to balance out the Caries procedure by unearthing all the sores and putting zinc oxide-based dressing[17]. The ART method depends on logical discoveries and supporters that this training is done appropriately; therefore the time engaged with doing a solitary rebuilding might take up to 20 minutes. The teeth are then re-established using a cutting edge, fluoride filling material. Most adults have higher dental anxiety during their childhood[18], so those people have not fully benefited from good dental care and they have all undergone more of its extractions rather than restorations. ART technique can be useful to this group of people. Patients with medical or physical disability undergo treatment with local anaesthesia[19]. The ART technique could be suitable for providing care for these patients. The procedures can be carried out in patients' homes, hospital or dental chairs. Use of these techniques in patients' homes will require minor adaptations like provision of the suitable light source. Some of the children may prefer anaesthesia for all dental treatment this may be due to the anxiety of fear or previous bad experience. Utilising of ART procedures for the treatment of youngsters may assist with accomplishing helpful, preventive and mental consideration as the kid to figures out how to conquer his or her feeling of trepidation of customary dental treatment[20]. ART appropriately utilised would give a substantially more worthy prolong to dental consideration than the ordinary infuse, drill and fill philosophy. Thus ART has a definite place in modern clinical practice as most of the practitioners of following this technique whenever there is a temporary restoration if needed[21]. However the success of the treatment requires additional steps like adequate caries removal, and training in the use of the technique is essential to avoid claims of supervised neglect by not carrying out the procedure thoroughly[22]. Recalling a review of the patient has to be undergone. Nervous patients who benefit from this technique gradually introduced to conventional treatment techniques.[23]

## Materials and Methods

A systematic review of the scientific literature was done in preparation of the manuscript. The systems and databases were searched for relevant articles from Pubmed and Google scholar from the year 2000.

Databases of intended journals were searched for keywords such as Atraumatic restorative treatment, instrument and material consideration, the survival of ART, advantages of ART etc. Exclusion criteria were case reports, review and studies in other languages.

## Discussion

Dental caries is a sugar dependent ailment that harms tooth structure and because of loss of mineral segments, may, in the end, lead to cavitation. Dental caries is the most predominant sickness worldwide and is viewed as the most significant weight of oral well-being. Ordinary treatment (drill and fill) include the utilisation of rotary burrs under sedation[24]. The requirement of electricity, costly handpieces and profoundly prepared dental well-being workforce may restrict access to dental treatment, particularly in immature areas.[25] To beat the confinement of ordinary treatments was grown for the most part for treating Caries in kids living in underserved territories where assets and officers, power and prepared labour are constrained[26]. ART is a minimally invasive approach that involves the expulsion of tissues using hand instruments, usually without the use of anaesthesia and electricity-driven equipment, and restoration of the dental cavity using an adhesive material. ART is perfectly aligned with modern concepts in healthcare, with adequate maximal effort regarding preventive approach and minimally invasive procedure. Also, ART has the other following advantages, the use of easily available and inexpensive hand instruments rather than more expensive electrically driven dental equipment, conservation of sound of tooth tissue through chemical adhesion of glass ionomers; limitations of pain, minimising the use of local anaesthesia, and low-cost.[23] As a result; many people living in less-developed areas can receive oral care using ART. Moreover, ART is also comfortable for patients with physical disabilities. Although initially developed to provide restorative dental treatment in areas of difficult access, ART or modified ART techniques are being increasingly introduced into dental clinics in industrialised countries.[20] ART may reduce pain experienced when compared with conventional treatment[27].ART is used to remove caries from the hard dentin caused by Streptococcus Mutans and lactobacilli. Chlorhexidine-gluconate is used to reduce the S. Mutans and lactobacilli [28,29].

The fundamental instruments for ART are mouth mirror, explorer, pair of tweezers, dental hatchet, small and medium-size excavator, spatula, Amalgam carrier/applier. To improve working permeability, an exceptional light source is fixed to a pair of spectacle frames that is powered by a rechargeable battery source. This unit likewise allows amplifying the glass to be connected. The essential materials are gloves, cotton rolls and pellets, glass Ionomer material, Vaseline, wedges, plastic strips and mortar.[30] Like other treatments ART also requires a proper patient to an operator position. Several devices have been developed and one among them is the light, weight cushion headrest that is attached to a short end of the table combined with the foldable cushion for the comfort of the patient receiving the treatment. The tooth or the teeth to be treated is isolated with a cotton wool roll. Enamel hatchet replaces the bur it is used to widen the entrance of the lesion by placing at the entrance and rotating backwards and forwards[31]. By rotating the instrument the unsupported enamel will be removed by creating an opening for the small excavator to enter depending upon the size of the cavity. A small or medium-sized excavator is used to remove caries. To remove calcified canal small hand files such as a size 6, 8 or 10 K-file are used to negotiate further into a system when coronal preparation has taken place[32]. Alternating between rotary and hand instrumentation while constantly bathing the pulp chamber of the tooth can expedite negotiation to the apex.[33] Glass ionomer cement is mixed and filled into the cavity; the mixed material is inserted using the flat end of the applier and plugged into the corners of the cavity either side of the excavator or with a ball burnisher.[34] Avoid air bubbles and the material is also placed in the pit and fissures. Vaseline is coated over the glove finger to prevent the glass ionomer from sticking to the glove. Place the finger over the mixture, apply pressure for a few seconds and remove the finger. [35] Treating and restoring anterior teeth is of great challenges nowadays for dentists because of aesthetics and now it is made easier and treated successfully with porcelain laminate veneers[36]. In ART procedure if there is any case of dental avulsion the doctors will not have any other way of storing the teeth rather than natural products like milk, coconut water green tea extract. [37]Intracanal medicaments are used for the essential step in destroying the bacteria in root canals; however, in modern endodontics, shaping

and cleaning may be assuming greater importance than intracanal medicaments as a means of disinfecting root canals. Until recently, formocresol and its relatives were frequently used as intracanal medicaments.[38]

Dental caries has been considered the most common global disease. Conventional methods involve the use of electric drills to clear away decayed areas of the tooth before filling. Local anaesthesia is normally injected to prevent pain during the procedure. Conventional treatments require highly trained dental health personnel, access to electricity, appropriate tools are more expensive[39]. All these factors may limit access, especially in underdeveloped regions. ART is used for managing dental decay, that involves the expulsion of decay tissues using hand instruments, without the use of sedation and electrical equipment and rebuilding of the dental cavity with an adhesive material, glass ionomer cement, composite resin, resin-modified glass ionomer cement. [40,41]Glass ionomer cement is the dominantly used restorative material used for ART. GIC restorative materials have advantages such as the ability to bond chemically to enamel and dentin, biocompatibility with pulpal tissues less potential to induce recurrent the least, inhibition of enamel demineralisation good cavity seal, ease of use and low-cost[42]. ART utilizes just hand instruments for opening/amplifying the pit and for expelling carious tissue. The measure of carious tissue that ought to be evacuated relies fundamentally upon the cavity depth. In cavities of shallow depth, the expulsion of carious tissue is up to firm dentine. In deep cavities, we're there is no sign of pulp exposure, pulp inflammation or any history of spontaneous pain, some amount soft dentine is left back in the pulpal floor/wall to avoid pulp exposure.[43,44]

The advantage of Atraumatic of ART is the easy availability and relatively inexpensive and instrument rather than expensive electricity is driven by dental equipment[17]. It is a biologically friendly approach involving the removal of only decalcified tooth structures, which result in relatively small cavities and conserve sound tooth tissue, there is a limitation of pain thereby minimising the need for local anaesthesia[45]. It is a straightforward and simple infection control practice without the need to use sequentially autoclave handpieces. The chemical adhesion of the glass ionomer that reduces the cut sound tooth tissues for retention of restoration material; the leaching of fluoride from the glass ionomer prevents secondary caries development. and probably [46]remineralise carious dentin. The ART technique is a non-threatening oral procedure. This characteristic has a great advantage of making oral care more popular among the population, in particular, the young. Fear inducing situations caused by dental equipment are not involved, and there is no sound of a drill or from suction equipment. The maximum number of instruments in the mouth at any one time is similar to that used for an oral examination, the mouth mirror in one hand and a working instrument in the other, thus ART is patient-friendly.[47,48].

## Conclusion

The greater part of the world's population has no access to restorative dental care. One of the main obstacles is the easy traditional manner of treating caries, which relies on electricity-driven equipment. The basic concept of the ART technique is the removal of the calcified dental tissues using only readily available hand instruments, following the modern concept of cavity preparation, and the use of a high technology adhesive restorative material. ART is a technique that has the potential to make oral care more available to a larger part of the world population than before.

**Acknowledgement**: We thank Saveetha Dental College for the support to conduct the study/review

**Conflict of Interest:** No potential conflict of interest relevant to this article was reported.

**Ethical Clearance**: As it is a review article so it is not required.

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