



Isolation of *Moraxella* and *Streptococcus* from New Packed Orthodontic Materials

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Abstract

This study aimed to test the sterility of new unused orthodontic arch wires received from manufacturers. Forty samples of arch wires with two types of wires (nitinol and stainless steel) from four companies were used directly from the manufactures package in this study. Out of (40) arch wires tested, bacteria was isolated from 3 (7.5%) samples, only two genera of bacteria were isolated, namely *Moraxella* and *Streptococcus*. Current results appear that bacterial contamination on arch wires give lights on the need of sterilization before clinical use.

Keywords: Orthodontic materials, Arch wires, Microbial contamination.

Introduction

A lot of new tools and products in field dentistry are usually assumed to be sterile before utilize, even though manufacturers' packaging may not mention that. Although all the tools that used in orthodontics, as in dentistry, are sterilized before use, the same does not apply to arch wires, impression trays, bands and brackets [1]. With such products likely to be closely related with the oral tissues (orthodontic bands impinging on the gingival sulcus and thus in contact with gingival crevicular fluid), there is a theoretical risk of cross-infection on placement.

In addition, after placement, they might cause trauma to the oral tissues, such as the buccal mucosa, which could be a pathway for infection [2]. Many of bacteria tend to attach hardly to surface and easily forming biofilm, which may be problem in dental settings [3]. It has been demonstrated that bacterial cells in the biofilms are more resistant to environmental stresses and antimicrobials compared to their planktonic counterparts [4]. *Barker et al* [5]. Investigated bacterial contamination of different orthodontic material that found large amount of *Staphylococcus epidermidis*

and founded that the largest source of contamination through skin contamination. And other type of bacteria found was *Streptococcus sanguinis*, it resident bacteria in the oral cavity as normal flora in healthy people, its inculpatas as contributing agent in infective endocarditis. Moreover, Purmal et al. Examined the sterility of "as received" molar tubes and isolated three genera of bacteria included, *Micrococcus luteus*, *Staphylococcus haemolyticus*, and *Acinetobacter calcoaceticus* [1]. This study aimed to test the sterility of new unused orthodontic arch wires received from manufacturers.

Material and Methods

In this study orthodontic materials taken from 4 different manufacturers (3M, Ortho Technology, Jiscop and G&H), consisted of two types of arch wires (nitinol and stainless-steel). The wire was cut into smaller pieces by using sterilized orthodontic instruments, and then these pieces of the arch wires were inserted into plane tubes that contain 10 ml of brain heart infusion (BHI) broth, and then samples were homogenized by Vortex mixer for one minute. Moreover 8 plane tubes with BHI broth without arch wires were

considered as controls group. Further 0.1 ml was withdrawn from plane tube and spread by using sterile microbiological spreader on agar plates.

The samples were cultured on blood agar. The blood agar plates were incubated aerobically for 48 hours, at 37 c° and an aerobically for 48 hours, at 37 c°. After the incubation process, identification was done using colony characteristics, gram staining and key biochemical reactions. Total bacterial count was determined by visual counting.

Results

From 40 samples investigated in current study the microbial growth was observed in 3 (7.5%) of samples. No growth was recovered from 37 (92.5%) of the samples and no growth of microorganism was observed from tris-EDTA sample without arch wire (control). *Moraxella* are isolated from two samples and *Streptococcus* are isolated from one sample on blood agar plates that incubated an aerobically, Table (1). The colony count of *Moraxella* was (125) and for *Streptococcus* was (60). *Moraxella* and *Streptococcus* were isolated from only Ortho-Technology Company, Table (4). As well these bacteria were recorded in stainless steel wires only, Table (3).

Table 1: Contamination with bacteria among samples

Samples (arch wire)		Number	Percentages
	With Contamination	3	7.5%
	Without Contamination	37	92.5%

Table 2: Count of bacteria isolated from arch wire

Microorganisms	Bacterial colony count
<i>Moraxella</i>	125
<i>Streptococcus</i>	60

Table2: Contamination with *Moraxella* and *Streptococcus* among companies

			Company			
			3M	Jiscop	G&H	Ortho Technology
	<i>Moraxella</i>	NO.	0	0	0	2
	<i>Streptococcus</i>	NO.	0	0	0	1
	Total	NO.	0	0	0	3

Table 3: Distribution of isolated bacteria among the wires

			Wires	
			Stainless Steel	Nitinol
	Contaminations	NO.	3	0
		%	100.00	0.0

Discussion

The finding of the present study has shown bacterial contamination on new unused orthodontic arch wires received from manufacturers. The level of contamination was found to be (60 to 125) colony. The isolated bacteria from the arch wire were *Moraxella* and *Streptococcus*. However, the bacterial contamination seen in the as received orthodontic materials could be related to the transmission of bacteria during the manufacturing process, handling or transport [6].

A study conducted by Roebuck [7] reported that over 90% of the manufacturers did not supplied sufficient information for the

cleaning of dental instruments and about 58% provided insufficient or incorrect instructions for sterilization.

In our previous study [8] we revealed the contamination of as received arch wires with *staphylococcus*. Moreover, Sheriteh and colleagues investigate the use of tungsten carbide debonding burs more than one time in hospital-based orthodontic departments [9]. The current results are consistent with other study done by Barker et al [5]. Who isolated bacteria from as received arch wires, although the microbial contamination was weak, the most commonly identified bacterial species was *Staphylococcus epidermidis*, followed by *Kocuria*, *Moraxella*, and *Micrococcus species*.

A study designed by Shikha Rastogi [10] investigated orthodontic materials and used reduced transport fluid medium to displace bacteria from the dental materials, and reported that the most commonly used orthodontic materials were found to be contaminated. The species identified were *Klebsiella*, *Streptococci* and *Citrobacter* from elastomeric chains, molar bands, buccal tubes and lingual sheaths. Other study [11] examines dental burs, and use Luriadifferent

dialoged agent under aerobic conditions. When the growth of bacteria was appear, further sub cultured in Luria-Bertani agar after that the bacteria subjected to some tests employ fatty acid profiles and 16S rRNA gene alignment profiles for bacterial identification.

Conclusion

Present data revealed that bacterial contamination on arch wires give lights on the need of sterilization before clinical use.

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