

Handpiece Maintenance Study: Oil and Lubrication

Objective:

To evaluate the ability of **Statmatic 31** (SciCan) and **Statcare** (SciCan) handpiece maintenance systems to inhibit the accumulation of debris within the internal components of the handpiece compared to competitor maintenance systems when used on substrates common to dentistry.

Experimental Design:

Four new electric dental handpieces (*Sanao* by SciCan) were designated to an experimental handpiece maintenance system or an untreated control; **Statmatic 31** (SciCan), **Statcare** (SciCan), **Assistina 301 Plus** (W&H), and untreated. Handpieces were fitted with *Great White Gold Series GW-2 Carbide Burs* (SSWHITE) and used on five substrates common to dentistry [*Admix Amalgam.*, *Benco Dental*; human teeth; *Mocar Porcelain Block*; *CeraSmart Ceramic Block*, *GC America*; and, multiple composites (*TPH3 Plus*, *Dentsply*; *Camouflage Universal NanoHybrid*, *Glidewell*; and *E-ON Universal*, *Benco Dental*)] (Figure 1). For each use/reprocessing cycle, a selected substrate was drilled on-and-off for 1-minute with low water flow, lubricated and cleaned by a designated handpiece maintenance system or left untreated, and then sterilized in the Statim 2000 (SciCan) sterilizer using the pre-programmed unwrapped cycle (Table 1). For this study dental handpieces were used and then reprocessed 150 times at which point the handpieces were disassembled, and internal components were examined and photographed using *Micro Enterprise microscope* with a *PixLink camera*.

Figure 1. Test substrates, left to right; amalgam, *CeraSmart* ceramic block, various composites, human tooth, and *Mocar* porcelain block

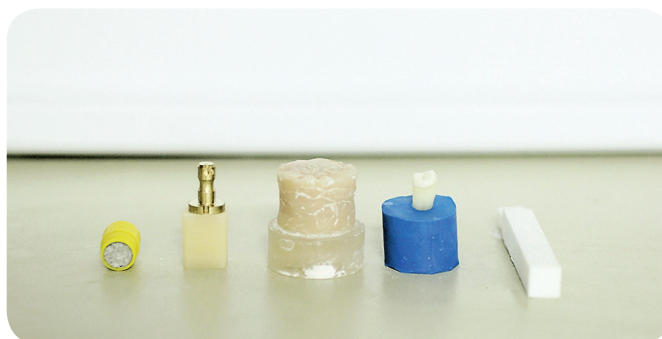


Table 1. Handpiece maintenance system pre-programmed cycle parameters

HP Maintenance System	Solutions Used	Length of Cycle (Secs)	Chuck Care
Statmatic 31	Oil	20	Yes
Statcare	Oil	21	Yes
Assistina 301 Plus	Oil, Cleaner	35	No

Results:

Four internal structures were examined in order to qualify the effects of each handpiece maintenance system on the test *Sanao* handpieces; head casing, cartridge, oblique shaft assembly, and push button (Table 2). After 150 cycles of use/maintenance/sterilization, the untreated (control) handpiece demonstrated considerable surface discoloration that suggests possible debris accumulation and/or corrosion on all four internal parts examined (Figure 2a-d). Similar findings seen with the control were observed with the handpiece maintained with the *Assistina 301 Plus* (Figure 3a-d). Conversely, the handpieces maintained with *Statmatic 31* and *Statcare* (Figures 4a-d and 5a-d), closely resembled the internal components of an unused handpiece with the exception of one small area on the oblique shaft assembly. This surface irregularity was limited to a small grooved area, whereas multiple locations on the oblique shaft showed surface discoloration with the untreated and *Assistina 301 plus* handpieces.

Table 2. Irregularities observed

Maintenance System	Head Casing	Cartridge	Oblique Shaft Assembly	Push Button
<i>Statmatic 31</i>	No	No	Yes	No
<i>Statcare</i>	No	No	Yes	No
<i>Assistina 301 Plus</i>	Yes	Yes	Yes	Yes
<i>Untreated</i>	Yes	Yes	Yes	Yes

Figure 2a-d. Internal components from untreated handpiece; a) head casing, b) cartridge, c) oblique shaft assembly, and d) push button

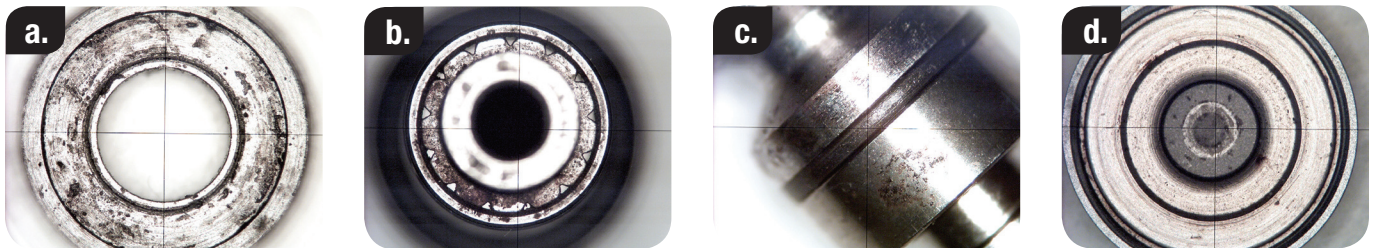


Figure 3a-d. Internal components from *Assistina 301 plus* handpiece; a) head casing, b) cartridge, c) oblique shaft assembly, and d) push button

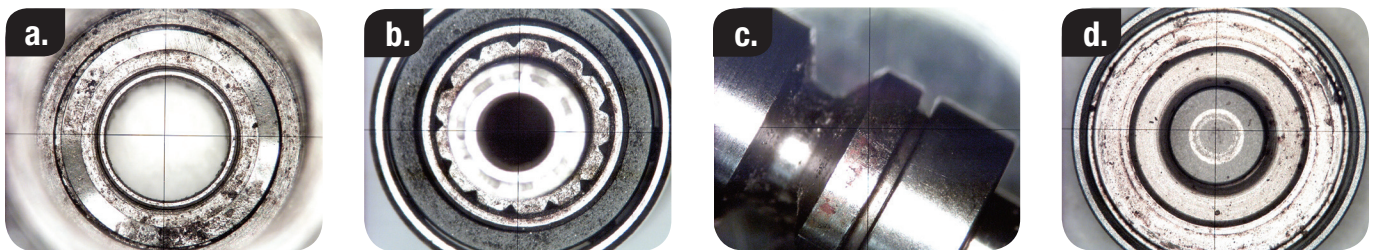


Figure 4a-d. Internal components from *Statmatic 31* handpiece; a) head casing, b) cartridge, c) oblique shaft assembly, and d) push button

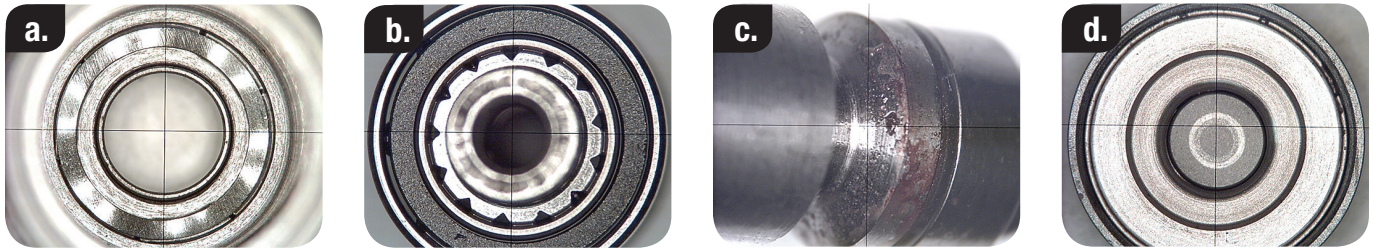
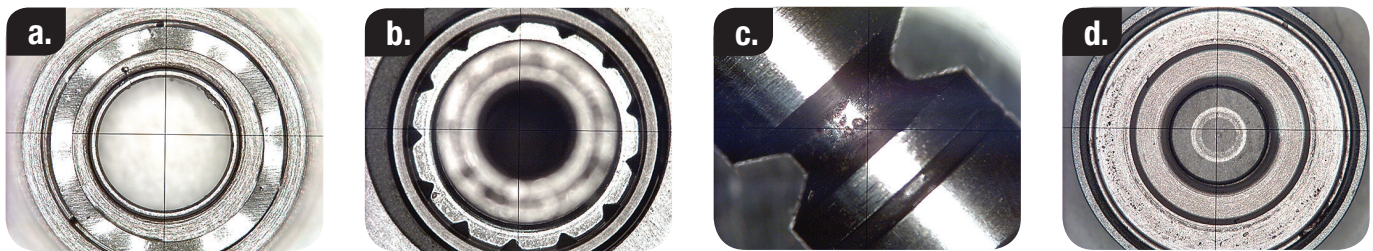


Figure 5a-d. Internal components from *Statcare* handpiece; a) head casing, b) cartridge, c) oblique shaft assembly, and d) push button



Discussion and Summary:

A number of automated systems are currently available, and these are able to reduce the potentially harmful effects human error can have on performance and device life expectancy. This investigation studied cleaning and internal maintenance of new *Sanao (SciCan)* electric handpieces by comparing findings using competitor automated systems and untreated controls. Experiments were designed to examine accumulated internal debris after simulated use.

After 150 cycles of simulated use on 5 hard substrates and treatment with the *Statmatic 31* and *Statcare* procedures, visual inspection of internal handpiece components revealed very little, if any, discoloration. In comparison, considerable discoloration, signifying possible debris accumulation, was noted following 150 cycles of prescribed *Assistina 301 Plus* cycles and untreated controls. Manufacturer's directions were followed for each system tested.

These findings from this *in vitro* experiments showed definitive differences between the previous generation of handpiece cleaning/lubrication stations and more recently available systems.