CLEANING FOR INFECTION CONTROL

Instrument Cleaning

Dental Clinics

MAJAC MEDICAL PRODUCTS

This presentation is designed to reflect the recommendations given in the following Australian Standards and Guidelines.

Throughout this discussion we have highlighted the science behind the recommendations .

Recommendations for Clinical Detergents For Cleaning Instruments

As per

Australian & New Zealand Standards AS/NZS 4187 & AS/NZS 4815

The Australia Dental Association (ADA) Guidelines

New Zealand Dental Association (NZDA) Guidelines

- Mild alkaline detergents in the pH range 8.0-10.8 are preferred over neutral pH detergents
- TGA Listed - Australia

RESPONSIBILITY

1. Responsibility for Cleaning & Infection Control lies with the practice management.

2. Implemented through the Responsible Operators.

3. Responsible Operators must ensure all steps in the Cleaning and Sterilizing process are :

Performed & Recorded

in accordance with the Practice Procedure Manual

Practice Procedure Manual

Procedures must comply with the recommendations of the various authorities prior to any "Surgically Clean" or "Sterilized" Instrument/Device being released for use on a patient.

Authorities Include:

Government Health Authorities – Accreditation Agencies (AGPAL - QIP)

ADA Standards – NZ Dental Association Standards

Australian & New Zealand Standards AS/NZS 4815

DOCUMENTATION OF CLEANING PROCEDURES IS AN IMPORTANT PROCESS

<u>Practices should document a Cleaning Procedure for;</u>

1. Surgical Instruments & devices
2. Equipment (sinks, ultrasonic cleaners, mechanical washers, brushes etc.)
3. Environment (Dental chairs, Instrument tables, Sterilising Room Waiting rooms, toilets etc.)

Cleaning & Drying of Instruments must be taken very seriously and should include;

- ✓ Dedicated staff with a good knowledge of the cleaning & drying process and the operation of mechanical and/or ultrasonic cleaners.
- ✓ A high quality cleaning agent.
- ✓ Proper procedures

Sterilisation should not be a substitute for good cleaning.

COMPLETE CLEANING IS ESSENTIAL BEFORE STERILISATION PROCESS CAN BE EFFECTIVE

Biological soils must NOT be allowed to dry prior to washing.

Drying tends to "set" biological soils, making them difficult to remove.

BECAUSE

Bio-soils & Biofilms may protect micro-organisms from Sterilisation/Disinfection.

Steam has to make contact with the surface of instruments to sterilise effectively.

*** A biofilm is a layer comprised of micro-organisms, bacterial mucopolysaccharides and adhering soil.*

BIOLOGICAL SOILS COMPRISE:

1. **Water soluble materials** *(Generally easier to wash away)*
   - Sugars
   - Inorganic salts (NaCl, KCl, Phosphates etc)
   - Proteins (Soluble Proteins)

2. **Water insoluble materials** *(Generally difficult to wash away)*
   - Fats
   - Proteins (structural proteins)

3. **Particulate Material**. (e.g. suture material, debris.)

Detergents for Cleaning Instruments & Devices

Clinidet

Medical & Dental Instrument & Equipment Detergent

Meets the requirements of ***AS/NZS4187 & AS/NZS 4815***

- ✓ **Pre-soaking**
- ✓ **Ultrasonic Cleaning**
- ✓ **Manual Cleaning**

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WHAT IS A DETERGENT ?

- A formulated solution designed for cleaning.
- Detergents contain a number of ingredients with specific functions to aid in the removal of soil.
- The most important of these are; 1. Surfactants 2. Alkaline Builders

Recommendations for CLINICAL DETERGENTS
As per Australian Standards AS/NZS 4187 & AS/NZS 4815

Biodegradable:	Ingredients (e.g. surfactants) should be biodegradable.
Non-corrosive:	Should not cause caustic burns
Non-toxic:	Should not contain poisons.
Non-abrasive:	Should be water soluble. Powder formulations may not completely dissolve and therefore present an abrasive risk.
Liquid:	Liquid formulations dispensed via dispensing pump. Safer for operator and minimises risk of contaminating the detergent.

Recommendations for CLINICAL DETERGENTS
As per Australian Standards AS/NZS 4187 & AS/NZS 4815

Low foaming: Foam does not obscure the instruments being washed. This reduces the risk of accidents.

Free Rinsing: Freely water soluble and free rinsing to ensure no detergent residues are left on the instruments.

Mild Alkaline: Mild alkaline detergents clean better than neutral or acid detergents. The pH of the diluted detergent should be between 8.00 and 10.8.

This is the pH range where corrosion of Steel is lowest.

BIO SOIL REMOVAL

Bio Soil Removal Involves Four Main Factors:

1. Chemical: Surfactants, alkalis, enzymes

2. Mechanical Action: Ultrasonic, spray jet, scrubbing etc

3. Temperature: High temperatures aid soil removal
   (At the correct stage of cleaning)

4. Time: Time in contact with the cleaning agent

CHEMICAL ACTIVITY - Surfactants

Surfactants play a major role in the cleaning process:

1. Surfactants wet surfaces more efficiently – Accelerate contact between the cleaning solution and the soils. ("They make water wetter")

2. Emulsify fats and lipids – Suspend them in solution to be washed away.

3. Aid in the solubilisation of proteins.

CHEMICAL ACTIVITY - Alkaline Builders

Alkaline Builders have a number of functions:

1. Bind with calcium and magnesium to "soften water" and improve the performance of surfactants.
2. Increase the solubility of proteins & fatty acids
3. Keep soil particles suspended in solution, & prevent re-deposition of soil onto cleaned surface.
4. Prevent corrosion of metals
5. Contribute to maintaining an alkaline pH and as a pH buffer

Alkalinity & the Cleaning Process

- Mildly Alkaline solutions place a negative charge on instrument surfaces & the suspended soil.
- Because all surfaces have the same charge they repel each other.
- This ***prevents*** "clumping", precipitation and ***re-deposition*** of soils on to the cleaned surfaces.

These fundamental principles of cleaning both instruments & surfaces are illustrated on the Majac Medical Web Site.

www.majacmedical.com.au

LEARNING CENTRE

THE IMPORTANCE OF pH TO CLEANING

The pH of the cleaning solution has a dramatic effect on Cleaning efficiency.

The chemistry of cleaning is well researched and documented & there is no doubt that alkaline solutions clean far better than do neutral or acid cleaners. See preceding slides.

Acid cleaners have very limited applications - mainly as metal brighteners & scale removal (bathroom cleaners).

THE IMPORTANCE OF pH TO CLEANING

- Mild alkalinity does not harm plastics.
- Mild alkalinity protects most metals.
- Mild Alkalinity aids the cleaning process.

Example	*pH*	*Description*
Sulphuric acid	0	Strong Acid
	1	
Stomach acid	2	
Vinegar Carbonated soft drinks	3	Mild Acid
Tomato Juice	4	
Coffee	5	
Milk Saliva	6	Physiological Region
Pure water Blood	7	
Sea water Sodium bicarbonate	8	
Borax	9	Mild Alkaline
Detergents		
	10	
Household hardsurface cleaners	11	
Sodium carbonate	12	
Oven cleaner Draino/	13	Strong Alkaline
Automatic Dishwashing	14	

The pH Scale

A mildly High or Low pH of a solution does not make it inherently harmful.

- Note the pH of soft drinks, tomato juice & vinegar.
- Most cleaning agents used in Medical & Healthcare contain mild alkaline / acidic agents.
- Note the pH range of cleaning agents. Detergents.

- Over the past few years many practice staff have become unnecessarily concerned about the pH of cleaning products.
- Mildly alkaline cleaning products are nether dangerous to the operator or materials.
- The following examples will help to put pH into perspective.

Nearly all Detergents House hold and commercial are **mildly** alkaline

pH in the World of Cleaning – Every Day Domestic Cleaners

pH = 10.5

pH = 9

pH = 11

pH = 9

pH in the World of Cleaning - Common Chlorine Disinfectants

pH = 10.6

pH = 11
(1:100)

pH = 11
pH = 9.2 (1:100)

Note: Milton is used to soak both plastic & soft rubber

Specialist Acid Cleaners

- Acid Cleaners have limited, but important applications for removing some inorganic scale, soap scum etc
- They can damage metal especially aluminum if used excessively

pH = 2

pH = 1

Alkalinity In Restoration

pH = 3

When you have too much of this highly acid mental lubricant

pH = 9
(1:100)

You will need some of this mildly alkaline stomach cleaner

Corrosion of Steel

Contrary to a popular myth - mild alkaline solutions do not corrode steel

"Water readily dissolves a small amount of oxygen from the atmosphere & this may become highly corrosive. When oxygen is removed, the water is practically non corrosive unless it becomes acidic or unless anaerobic bacteria incite corrosion. If oxygen free water is maintained slightly alkaline, it is practically non corrosive to steel.

Corrosion & Corrosion Protection Handbook.

Edited by Philip A. Schweitzer, Chem-Pro Corporation

"Waters are sometimes deliberately made alkaline for corrosion control"

Corrosion Science & Technology CRC Series in Material Science & Technology

Editor Brian Ralph

BIO SOIL REMOVAL

Remember this slide from earlier? We have dealt with Chemical action, we will now deal quickly with the remaining 3 Factors.

Bio Soil Removal Involves Four Main Factors:

1. Chemical: Surfactants, alkalis, enzymes
2. Mechanical Action: Ultrasonic, spray jet, scrubbing etc
3. Temperature: High temperatures aid soil removal (At the correct stage of cleaning)
4. Time: Time in contact with the cleaning agent

MECHANICAL ACTIVITY

Mechanical activity or energy must be applied to the cleaning process to adequately remove adhering soils.

Energy input can take the form of:

1. Brushing
2. Ultrasonic Cleaner (most effective)
3. Pressure jets
4. High flow rates of cleaning solution (particularly applies to tubes etc)

As far as possible do NOT rely on passive cleaning.

TEMPERATURE

High temperatures will improve the removal of fats & lipids

HOWEVER high temperatures can "cook" proteins onto surfaces making them difficult to remove.

1. Rinse instruments in clean water at a temperature between ambient and 37 - 40°C.
2. Washing solution should be at or below 37 - 40°C.
3. Final rinse should be warm to hot.

A final hot rinse will remove detergent residues & suspended soils far better than a cold rinse

TIME

Long contact times between soil and the cleaning solution improve the removal of soil

HOWEVER : Instruments should NOT be soaked in aqueous solutions for excessive periods of time because;

- Detergent solutions will be contaminated after a period with biological soils which are capable of supporting bacterial growth that can contaminate instruments (e.g. *pseudomonas*).
- Mildly Alkaline detergents tend to show less bacterial growth compared to neutral/acidic detergents.

Where possible soak instruments for a maximum of 30 minutes prior to washing

**** Change contaminated detergent regularly throughout the day.****

Important Tips For Washing Instruments

1. Where possible use an Ultrasonic Cleaner or Washer.
2. Use a quality mildly alkaline clinical detergent.
3. Change washing detergent regularly throughout the day.
4. Do not soak instruments for long periods of time. Water & oxygen corrode metals. Prolonged soaking or leaving instruments wet (even clean rinse water) will cause corrosion.
5. Dry instruments immediately after washing.
6. Use a Drying Cabinet or a lint free cloth.

MANUAL CLEANING PROTOCOL

1. Rinse contaminated instruments under cold/tepid running water NOT hot water
2. Dismantle instruments and immerse in tepid detergent solution. NOT hot water
3. Scrub with a firm bristle brush, preferably under water.
   Do NOT use abrasive cleaners or steel wool
4. Rinse clean in warm/hot running water.
5. (Hot water is preferable at this stage)
5. Inspect for cleanliness.
6. Dry in a cabinet or with a lint free cloth before packaging.
7. *Wipe or shake off excess water if not packaging before sterilising.

Replace contaminated detergent solution with fresh solution as often as possible.

This ensures maximum cleaning and minimises bioburden.

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