These guidelines have been withdrawn

MOH clinical practice guidelines are considered withdrawn five years after publication unless otherwise specified in individual guidelines. Users should keep in mind that evidence-based guidelines are only as current as the evidence that supports them and new evidence can supersede recommendations made in the guidelines.

CLINICAL PRACTICE GUIDELINES

Contact Lens Care

Ministry of Health

NMRC
National Medical Research Council

National Committee On Ophthalmology

Jan 2001

CLINICAL PRACTICE GUIDELINES

Contact Lens Care

MOH Clinical Practice Guidelines 1/2001

Available on the MOH website: http://www.gov.sg/moh/pub/cpg/cpg.htm

Statement of Intent

These guidelines are not intended to serve as a standard of medical care. Standards of medical care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge advances and patterns of care evolve.

The contents of this publication are guidelines to clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care. Each practitioner is ultimately responsible for the management of his/her unique patient in the light of the clinical data presented by the patient and the diagnostic and treatment options available.

Foreword

Contact lens wear is common in Singapore due to the high prevalence of myopia. About 40% of our adult population are myopic and it is estimated that there are more than 250,000 contact lens wearers in Singapore. Nevertheless, contact lens wear is not innocuous to the eye as improper use and fitting may result in sight-threatening complications.

The Ministry has taken active steps to reduce the incidence of complications arising from contact lens wear by introducing the Contact Lens Practitioners Act, conducting public education on contact lens care and ensuring the quality of contact lens and disinfecting solutions sold.

These guidelines on Contact Lens Care have been drawn up by the National Committee on Ophthalmology and reviewed by the Contact Lens Practitioners Board.

We are delighted to present these guidelines to all medical and contact-lens practitioners.

PROFESSOR TAN CHORH CHUAN
DIRECTOR OF MEDICAL SERVICES

Contents

1 Introduction

1.1 Contact lens wear in Singapore

In a population based survey conducted in 1998, the prevalence of contact lens wear was found to be 9%.[1] Although contact lens wear is generally safe, nevertheless, it can result in various complications. These complications arise due to various factors that are largely lens-related and patient-related. Serious complications can be prevented if detected and treated early.

1.2 Contact lens related problems

Complications that may result from contact lens wear include allergic conjunctivitis such as giant papillary conjunctivitis, dry eye syndrome, corneal infiltrates, corneal vascularisation, corneal oedema, corneal abrasions and infective keratitis, the last of which is potentially sight threatening.

1.2.1 Allergic conjunctivitis

Allergic conjunctivitis, for example, giant papillary conjunctivitis (GPC)[2-6] is a relatively common complication from contact lens wear. Giant papillary conjunctivitis occurs in approximately 1-15% of contact lens wearers and is more common in soft lens wearers than rigid lens wearers. Among soft lens wearers, the incidence of GPC in patients wearing conventional daily wear lenses was higher compared to those patients wearing disposable daily wear lenses.[6] In a study by Boswell et al,[7] the incidence of GPC was 34% in those who wore conventional extended wear lenses while it was 5% in those individuals who wore disposable extended wear lenses replaced on a weekly interval.

1.2.2 Microbial keratitis

Microbial keratitis is the most serious problem of contact lens wear.[8-13] Contact lens wear was the largest single predisposing factor that accounted for 34% of patients with corneal ulcers admitted to the Singapore General Hospital during a 21-month period from March 1992 to December 1993.[14] Due to such risks associated with contact

lens wear, the US Food and Drug Administration (FDA) has defined contact lenses as medical devices since 1976. Contact lens associated infections include bacterial infections, usually caused by gram-negative rods or gram-positive cocci, fungal infections and *Acanthamoeba* keratitis.[15-17]

The annual incidence of microbial keratitis associated with contact lens wear varies with the type of lens worn (rigid gas permeable [RPG], soft, disposable, conventional, daily or extended wear). Among the different contact lenses, the relative risk of ulcerative keratitis is highest in extended lens wearers.[6, 18-31] Disposable lenses are also associated with microbial keratitis. [26,27,32,33] New soft contact lens polymers are currently being evaluated for their safety when used as extended wear lenses.[34]

Microbial contamination is an important predisposing factor in contact lens associated microbial keratitis.[35] Contaminating microbes originate from various environmental sources. Many patients who fail to follow lens hygiene recommendations develop contact lens associated microbial keratitis.[36]

Hence, it is necessary to set out in these guidelines safe contact lens wear practice to minimise the risk of such complications.

1.3 Methodology

These guidelines were developed by an expert workgroup appointed by the National Committee on Ophthalmology. The workgroup conducted a systemic review of current medical literature and presented the draft guidelines to other ophthalmologists for their comments. As the majority of contact lens practitioners are optometrists, these guidelines were also presented to the Contact Lens Practitioners Board for their endorsement.

1.4 Objectives

The guidelines have the following objectives:

- establish safe contact lens wear and care for contact lens wearers so as to minimise contact lens complications

- recommend to eye-care professionals appropriate procedures when carrying out contact lens fitting and disinfection of trial lens

1.5 Target group

These guidelines are developed for eye-care professionals i.e. ophthalmologists, medical practitioners and optometrists who are involved in contact lens dispensing and follow up.

2 Levels of evidence and grades of recommendation

Levels of evidence

Level	Type of Evidence
Ia	Evidence obtained from meta-analysis of randomised controlled trials.
Ib	Evidence obtained from at least one randomised controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomisation
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study.
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

Grades of recommendation

Grade	Recommendation
A (evidence levels Ia, Ib)	Requires at least one randomised controlled trial as part of the body of literature of overall good quality and consistency addressing the specific recommendation.
B (evidence levels IIa, IIb, III)	Requires availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation.
C (evidence level IV)	Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality.
GPP (good practice points)	Recommended best practice based on the clinical experience of the guideline development group.

3 Executive summary of recommendations

Patient selection and care

B Patients selected for cosmetic contact lens wear should be free of ocular surface disease and capable of good personal hygiene and compliance.

Grade B, Level IIb

B A daily wear schedule is recommended for most patients in view of the increased risk of microbial keratitis in extended contact lens wear.

Grade B, Level IIa

C Contact lens practitioners should stress the importance of lens care compliance and look out for potential contact lens complications and lens spoilage during follow-up visits.

Grade C, Level IV

C Contact lens wearers should be advised to remove the contact lenses immediately whenever redness, tearing, visual loss or pain occurs and to consult his/her eye-care professional at once.

Grade C, Level IV

C When a contact lens wearer presents with a red eye, it is important to exclude a microbial cause of keratoconjunctivitis and to refrain from prescribing steroid eyedrops.

Grade C, Level IV

GPP If microbial keratoconjunctivitis is suspected, topical antibiotics with adequate coverage for Gram-negative organisms should be instituted.

Reducing contact lens contamination

B Keeping the contact lens storage case clean might have a protective benefit in avoiding ulcerative keratitis.

Grade B, Level IIa

C Prophylactic topical antibiotics should be considered when using therapeutic lens on an extended wear basis.

Grade C, Level IV

Providing public education of contact lens care

B Contact lens wearers must be well educated on contact lens care hygiene as this will reduce the risk of complications.

Grade B, Level IIb

B Patient education could be in the form of verbal explanations, written instructions, hands-on demonstrations and periodic reinforcements.

Grade B, Level IIb

Disinfection of trial lenses

B Clean and disinfect all trial lenses after each use.

Grade B, Level IIb

B Contact lenses should be properly cleaned with a surfactant cleaner and rinsed prior to storage.

Grade B, Level IIa

B Disinfection of all trial (soft and hard) lenses should be performed with a commercially available hydrogen peroxide contact lens disinfecting system currently approved for soft lenses.

Grade B, Level IIb

B Heat-disinfect lenses that can withstand heating e.g. certain soft and Polymethyl methacrylate (PMMA) lenses at 78-80°C for 10 minutes.

Grade B, Level IIa

B After heat/hydrogen peroxide disinfection, contact lenses should be stored in chemical disinfecting solutions.

Grade B, Level IIa

C Certain rigid lenses can be stored dry after cleaning and soaking for a minimum of 10 minutes in hydrogen peroxide.

Grade C, Level IV

4 Prevention of complications

Methods to prevent contact lens complications include:

4.1 Patient selection and care

B Patients selected for cosmetic contact lens wear should be free of ocular surface disease and capable of good personal hygiene and compliance. [35,36]

Grade B, Level IIb

B A daily wear schedule is recommended for most patients in view of the increased risk of microbial keratitis in extended contact lens wear [18-21,24,26-31]

Grade B, Level IIa

New soft contact lens polymers which may reduce the risk of microbial keratitis resulting from extended wear contact lenses are currently being evaluated.[34]

C Contact lens practitioners should stress the importance of lens care compliance and look out for potential contact lens complications and lens spoilage during follow-up visits.

Grade C, Level IV

Conventional soft contact lenses should be replaced regularly, preferably every one to two years. Rigid gas permeable lenses should be replaced when spoilage is detected. Disposable/frequent replacement lenses should not be worn beyond the recommended duration.

C Contact lens wearers should be advised to remove the contact lenses immediately whenever redness, tearing, visual loss or pain occurs and to consult his/her eye-care professional at once.

Grade C, Level IV

C When a contact lens wearer presents with a red eye, it is important to exclude a microbial cause of keratoconjunctivitis and to refrain from prescribing steroid eyedrops.

Grade C, Level IV

GPP If microbial keratoconjunctivitis is suspected, topical antibiotics with adequate coverage for Gram-negative organisms should be instituted.[14]

4.2 Reducing contact lens contamination

Many patients who develop contact lens associated microbial keratitis are not compliant with lens hygiene recommendations.[36] Care must be taken to use sterile solutions. Home-made saline, tap water and other bottled nonpreserved solutions should not be used for contact lens rinsing except prior to heat disinfection.

B Keeping the contact lens storage case clean might have a protective benefit in avoiding ulcerative keratitis.[30]

Grade B, Level IIa

Right and left contact lenses should be kept separate and the contact lens storage vial should ideally be kept clean and periodically replaced.

C Prophylactic topical antibiotics should be considered when using therapeutic lens on an extended wear basis.

Grade C, Level IV

4.3 Providing public education

Patient education is important to ensure that the lenses are used properly. Contact lens wearers must recognise that contact lenses are not a trouble-free alternative to spectacles and are a major cause of sight-threatening eye infections.

B **Contact lens wearers must be well educated on contact lens care hygiene as this will reduce the risk of complications.** [36]

Grade B, Level IIb

B **Patient education could be in the form of verbal explanations, written instructions, hands-on demonstrations and periodic reinforcements.**[35]

Grade B, Level IIb

5 Advice for contact lens wearers

Guidelines for patients should include practical suggestions that can be incorporated into a daily routine as follows:[37]

(a) Wash hands before handling contact lens.

(b) Remove daily wear lenses nightly. Clean and disinfect lenses after each removal, following recommended guidelines for an approved contact lens care system.

(c) Use clean accessories and sterile solutions. Lens storage and carrying cases should be clean and airtight. Separate compartments are preferred to common well storage containers. The lens case should be cleaned regularly.

(d) Avoid moistening contact lenses prior to insertion with any solution that may not be sterile.

(e) Do not wear contact lenses while swimming.

(f) Have the contact lenses checked periodically and replaced regularly.

(g) Remove the contact lens immediately and seek professional care at once if symptoms of corneal inflammation occur.

6 Contact lens practice and trial lens disinfection

6.1 Contact lens fitting

Contact lens fitting carries the risk of transmitting infectious agents, including adenovirus, herpes virus, *Pseudomonas aeruginosa* and human immunodeficiency virus (HIV). [38,39] HIV can be found in the tears [40] and contact lenses [41] of affected individuals. Although no case of transmission of this virus through tears or contact lenses has been suspected or documented, [42-44] a number of precautions must be observed to ensure safety in the clinic.

Contact lens practitioners should utilise universal precautions with all patients to minimise the risk of contracting or transmitting infectious diseases, which includes HIV.

These precautions are:

- **Washing hands**

  Hands should be washed with an approved germicidal soap and water and thoroughly dried with a disposable towel between eye examinations.

- **Safe handling of contaminated sharps**

  Needles should never be recapped. All contaminated needles and sharp objects should be placed in a puncture resistant container after use.

- **Disinfecting equipment and instruments**

  Surfaces and non-metallic equipment are disinfected with a 1:10 (volume to volume) dilution of household bleach with water which provides a hypochlorite concentration of about 0.5%.

  For instruments such as the Goldman tonometer, soaking the tip in 0.5% hypochlorite solution for 10 minutes followed by washing with water and allowing to air dry is effective. [45] Alternatively, wiping the tip of the Goldman tonometer with a 70% isopropyl alcohol swab and allow it to air-dry is also as

effective.[46] 0.5% hypochlorite solution and 70% isopropyl alcohol are likely to be effective for disinfecting of goniolenses. Metal instruments should be autoclaved or soaked in 70% isopropyl alcohol.

7 Contact lens trial lens disinfection

Heat and peroxide disinfection are very effective modes of trial lens disinfection and are recommended by the Centers For Disease Control (CDC), USA, for disinfection of contact lens used in trial fittings.

7.1 Heat disinfection

Heat disinfection is the standard with which all other methods of disinfection are compared for efficacy. It has been found that a 10-minute exposure to a temperature of 80°C is highly effective for virtually all organisms concerned, including *Acanthamoeba* and HIV.[47,48] Hence, heat disinfection is the best method for in-office disinfection of trial lenses.

7.2 Peroxide disinfection

Hydrogen peroxide at a concentration of 3% is capable of rapidly destroying all bacteria and fungi of concern as well as HIV.[49-51] Peroxide is not reliably effective against *Acanthamoeba*.[52]

7.3 Recommedations for disinfection/inactivation of Human T Lymphocyte Virus Type III (HTLV-III) / Lymphoadenopathy-Associated Virus (LAV)

The following recommendations are based on data from studies conducted at the National Institute of Health (NIH) and CDC on disinfection/inactivation of HTLV-III/LAV:[53-59]

(a) Disinfect trial hard lenses with a commercially available hydrogen peroxide contact lens disinfecting system currently approved for soft contact lenses (other hydrogen peroxide preparations may contain preservatives that could discolour the lenses). Alternatively, most trial hard lenses can be treated with the standard heat disinfection regimen used for soft lenses (78-80°C for 10 minutes). Practitioners should check with hard lens suppliers to ascertain which lenses can be safely heat-treated.

(b) RGP trial fitting lenses can be disinfected using the above hydrogen peroxide disinfection system. RGP lenses may warp if they are heat disinfected.

(c) Soft trial fitting lenses can be disinfected using the same hydrogen peroxide system. Some soft lenses have also been approved for heat disinfection.

Although peroxide provides an excellent method for patient disinfection of lenses, it may be unsuitable for office care of trial lenses as neutralised peroxide is not considered effective for storage longer than a week. Hence, the trial lenses need to be stored in FDA approved storage solutions after disinfection with hydrogen peroxide.

7.4 Recommendations for disinfection of trial lenses

The workgroup's recommendations for disinfection of trial lens are as follows:

- **B Clean and disinfect all trial lenses after each use.**[35]

  Grade B, Level IIb

- **B Contact lenses should be properly cleaned with a surfactant cleaner and rinsed prior to storage.**[47]

  Grade B, Level IIa

- Disinfection of trial lenses should be performed as follows:

  - **B Disinfection of all trial (soft and hard) lenses should be performed with a commercially available hydrogen peroxide contact lens disinfecting system currently approved for soft lenses.**[53-59]

    Grade B, Level IIb

    Other hydrogen peroxide preparations may contain preservatives that could discolour the lenses. Alternatively, most trial hard lenses eg. PMMA can be treated with the standard heat disinfection regimen used for soft lenses at 78-80°C for 10 minutes. Practitioners should check with hard

lens suppliers to ascertain which lenses can be safely heat-treated.

- Soft trial fitting lenses can be disinfected using the same hydrogen peroxide system. Some soft lenses have also been approved for heat disinfection.

B Heat-disinfect lenses that can withstand heating e.g. certain soft and PMMA lenses at 78-80°C for 10 minutes.[46,48]

Grade B, Level IIa

- RGP trial fitting lenses can be disinfected using the above hydrogen peroxide disinfection system. RGP lenses may warp if they are heat disinfected.

- **B After heat/hydrogen peroxide disinfection, contact lenses should be stored in chemical disinfecting solutions.[47]**

Grade B, Level IIa

- **C Certain rigid lenses can be stored dry after cleaning and soaking for a minimum of 10 minutes in hydrogen peroxide.**

Grade C, Level IV

With the increasing popularity of disposable lenses, the problems of cleaning and disinfecting trial lenses can be avoided by simply discarding the trial lenses after use.

8 Recommendations for evaluation

The audit parameters for contact lens care are as follows:

- Contact lens wearers should be reviewed by their eye care professional within 6 months of initial contact lens fitting.

- Unless there is an ocular pathology, visual acuity with contact lens on should be at least 6/12.

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10 Workgroup members

The members of the workgroup are:

Chairperson: Dr Lim Li

Members: Dr Khoo Chong Yew
Dr Chan Wing Kwong
Dr Donald Tan

Annex Precautions during ophthalmic procedures

	Items	*Precautionary Measures*
1	Handwashing	• Necessary for all health care workers who perform eye examinations or other procedures involving contact with tears. • Hands must be washed with an appropriate antiseptic before, and immediately after a procedure and between patients.
2	Disposable gloves	• Necessary for invasive procedures. • For eye examinations, gloves should be worn when practical and convenient. • Gloves must be worn when there are cuts, scratches or dermatological lesions on hands.
3	Sterilisation / Disinfection of instruments	• Instruments used for invasive procedures must be properly sterilised. • Instruments that come into direct contact with external surfaces of the eye must be wiped clean and then disinfected by a 5-10 minutes exposures to : a) a fresh solution of 3% hydrogen peroxide; or b) a fresh solution of 1:10 dilution of 5.25% sodium hypochlorite; or c) 70% ethanol; or d) 70% isopropanol. Such instruments must be rinsed thoroughly in sterile distilled water or sterile normal saline before use.

	Items	*Precautionary Measures*
4	Disinfection of contact lenses	Contact lenses used in trial fittings must be disinfected between each fitting by one of the following regimes: a) **Hard Lenses** can be disinfected with a commercially available hydrogen peroxide contact lens disinfecting system currently approved for contact lenses. (Other hydrogen peroxide preparations may contain preservatives that could discolour the lenses). Alternatively, most trial hard lenses can be treated with the standard heat disinfection regimen used for soft lenses (78–80^{o} C for 10 minutes). Practitioners should check with hard lens suppliers to ascertain which lenses can be safely heat-treated. b) **Rigid Gas Permeable (RGP) Lenses** can be disinfected using the above hydrogen peroxide disinfection system. RGP lenses may warp if they are heat disinfected. c) **Soft Lenses** can be disinfected using the same hydrogen peroxide system. Some soft lenses have also been approved for heat disinfection. Until other disinfectants used in standard contact lens solutions are shown to be suitable for disinfecting HIV, contact lenses used in the eyes of patients suspected or known to be HIV infected should be disinfected by hydrogen peroxide.

Modified from Ministry of Health (Singapore) Guidelines for preventing transmission of bloodborne infection in a health care setting; 2000.

MOH CLINICAL PRACTICE GUIDELINE 1/2001

Contact Lens Care

Ministry of Health

NMRC
National Medical Research Council

National Committee On Ophthalmology

Patient selection and care

1. Contact lens wearers should:

    - Have healthy ocular surface
    - Have good personal hygiene
    - Be compliant with contact lens care instructions

2. Daily lens wear schedule should be recommended.

3. Remove lens immediately if problems arise and seek professional help at once.

4. If a contact lens wearer presents with a red eye, exclude a microbial cause and refrain from prescribing steroid eyedrops. If ocular infection is suspected, prescribe topical antibiotics with Gram-negative coverage.

Reducing contact lens contamination

1. Use sterile solutions.

2. Keep contact lens storage case clean.

3. Use prophylactic antibiotics for therapeutic lenses on an extended wear basis.

Disinfection of trial lenses

1. Clean and disinfect all trial lenses after each use.

2. Contact lenses should be cleaned with a surfactant cleaner and rinsed prior to storage.

3. Disinfect all trial (soft and hard) lenses with a commercially available hydrogen peroxide soft contact lens disinfecting system.

4. Heat disinfect lenses that can withstand heating e.g. certain soft and Polymethyl methacrylate lenses.

5. After heat/hydrogen peroxide disinfection, contact lenses should be stored in chemical disinfecting solutions.

6. Certain rigid lenses can be stored dry after cleaning and soaking for a minimum of 10 minutes in hydrogen peroxide.

Providing public education

Contact lens wearers must be well-educated on contact lens care hygiene.

Advise for contact lens wearers

Practical suggestions that can be incorporated into a patient's daily routine as follows:

- Wash hands before handling contact lens.

- Remove daily wear lenses nightly. Clean and disinfect lenses after each removal, following recommended guidelines for an approved contact lens care system.

- Use clean accessories and sterile solutions. Lens storage and carrying cases should be clean and airtight. Separate compartments are preferred to common well storage containers. The lens case should be cleaned regularly.

- Avoid moistening contact lenses prior to insertion with any solution that may not be sterile.

- Do not wear contact lenses while swimming.

- Have the contact lenses checked periodically and replaced regularly.

- Remove the contact lens immediately and seek professional care at once if symptoms of corneal inflammation occur.