

STUDY GUIDE FOR CONTACT LENSES

(UNIT 1-9)

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LEVEL: B.Sc**

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Vision Sciences Programme

**Diploma In Vision Sciences
for Ophthalmic Technicians
B.Sc Vision Sciences
B.Sc Honours in Vision Sciences**



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Structure of the course

The course "Contact Lenses" has been structured to make it as easy as possible for you to do the required work. Like a half credit course this course consists of nine units. One unit is study work of two week, thus the total study period will be of 18 weeks.

We have organized this course to enable you to acquire the skills of self-learning. For each unit, an introduction is given to help you to develop an objective analysis of the major and sub-themes, discussed in the prescribed reading material. Beside this, objectives of each unit are very specifically laid down to facilitate in developing a clear logical approach. We have also given you Self-Assessment Exercise, which are present at end of each unit. Questions in the Self Assessment Exercise are not only meant to facilitate you in understanding the required readings but to provide you an opportunity to assess yourself. Since the course work of one unit includes studying the prescribed reading material and carrying out the self-assessment questions, activities assignments and practicals, you are required to spend two weeks on each unit.

For this course "Fortnightly Tutorials" are arranged in the University's Selected Regional Study Centers. They provide you the facility of meeting with one another for discussion and mutual help & for group and individual discussion with fellows and tutors.

a) **How to use reading material:**

As this is a distance education course, we have organized the required course work in the following manner to help you in evolving a self-learning process in the absence of formal classroom teaching.

- 1) A detailed course introduction
- 2) Introduction to each unit.

- 3) The major theme of the unit is listed along with readings. list of suggested & prescribed reading is given at the end of each unit.
- 4) Self Assessment Exercise given in the reference text are not only meant to facilitate you in understanding but will also suggest a direction in which we expect you to think and analyze.

b) How to attend tutorials:

Tentative Tutorial & Practical schedule is provided to you in your study packs. & 70% attendance in the tutorials is compulsory in order to appear in the exam. Before attending the tutorial, you are required to prepare yourself by reading the topics to be taught in the next tutorial carefully and mark the points which you can't understand yourself in order to discuss them with your tutor and your colleagues.

WELCOME FROM COURSE COORDINATOR

Dear students, Contact Lenses are gaining more importance in modern practices of optometry and refraction. These are used both for therapeutic as well as cosmetic purposes. This study guide will provide you information about the history, importance, types, indications and contraindications and handling of contact lenses. As always, it will focus on the objectives formulated by very senior ophthalmologists and optometrists in a workshop. It will also guide you about the reading lists for each unit. It is worth repeating that the prescribed reading given at the end of each study unit is what you have to read while the suggested reading is to help those who are always seeking for more knowledge and is optional. The self-evaluation exercises mentioned at the end of the study units will help you to assess your understanding of the subject. The language is kept very simple throughout.

I hope this will be a fruitful effort. Wish you success in your studies

INTRODUCTION TO THE COURSE

Dear students, Contact lenses are small, thin optical lenses worn on the front surface of the eye to correct focus imperfections in the eye. Contact lenses correct refractive eye problems such as myopia, hyperopia and astigmatism. They can replace bifocal glasses and even enhance or change ones eye colour. This course is designed in a way to assist you in gaining relevant knowledge and skills necessary to enable you to use contact lenses in clinical practice.

AIMS AND OBJECTIVES OF THE COURSE:

After studying this course, You should be able to:

1. Know brief history and types of contact lenses.
2. Differentiate between different types of contact lenses.
3. Identify indications and contraindications of contact lenses.
4. Fit soft contact lenses.
5. Refract and convert for contact lenses.
6. Store, clean and disinfect contact lenses.
7. Educate contact lens users.

UNIT NO 1:

BRIEF HISTORY OF DEVELOPMENT OF CONTACT LENSES

INTRODUCTION:

One can never deny the importance of history. This unit will take you to a brief visit of the history of development of contact lenses. You will then realize that the kind of contact lenses that you have in the market today, have evolved over centuries to get into the existing.

LEARNING OBJECTIVES:

After studying this unit, you should be able to:

1. Know the brief history of the development of contact lenses.

INDICATIVE CONTENT:

1.1 Brief history of development of contact lenses

It is very interesting to know that the idea of corrected lenses directly fitted onto the eye was first given by Leonardo Da'Vinci back in 15th century, in his illustrations. Later, Rene Descartes of France suggested the corneal contact lens in 1632. Then, about 200 years later, Sir John Herschel-an English astronomer, gave the idea of grinding a contact lens to conform exactly to the eye's surface in 1827. It was only in 1887 that Glass blower F.E. Muller of Wiesbaden (Germany) put these ideas into practice and developed the first contact lens. These contact lenses were blown from glass and had to be ground and polished. This was a very difficult task and demanded time and great deal of skill.

Plastic was first introduced in lenses around 1936. These too covered the whole eye. These were made on watch makers lathes out of blocks of plastic 1 inch thick. The first PMMA corneal lens was designed in 1947. It consisted of a single curve and had a total diameter of 11 mm. It was not a practical success due to physiological reasons. Bier in early 1950's realized the complexity of corneal structure and introduced a bicurved construction.

A flatter third curve was later added to further improve the results, it assisted in tear circulation. In late 1960's, the complex elliptical shape of cornea was better understood and multicurve lenses together with aspheric construction evolved. In 1961, the first hydrophilic (soft) lens was produced in Czechoslovakia but, these were not released for commercial distribution in United States until 1971.

Today, modern contact lenses are produced on state of art computer controlled lathes and are accurate to microns. The currently available lenses are made from various types of gas permeable materials and are both extremely comfortable and convenient to use.

RECOMMENDED LIST OF READING PRESCRIBED READINGS:

1. Notes given in the study guide.
2. Robert Fletcher, Luigi Lupelli and Angela Rossi. The Background to Contact lenses. Contact Lens Practice. A Clinical Guide, p 2-5.
3. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Rigid Contact Lenses: Basics. The Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. P 276-277.
4. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Soft contact lenses. The Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. P 316-318.

SUGGESTED READING

1. Theodore P. Grosvenor, O.D. Prescribing Contact Lenses. Primary Care Optometry, Second Edition, P 395-396.
2. Anthony J. Phillips. Lynne Speedwell. The History of Contact Lenses. Contact Lenses. 4th Edition, P 1-16.

SELF ASSESSMENT EXERCISES

Given in the reference text.



UNIT NO 2:

CONTACT LENS MATERIALS AND MANUFACTURING TECHNIQUES

INTRODUCTION

In modern contact lens practices, it is very important to know about the available lens materials and relevant techniques in order to satisfy the users. This unit will help you to have the relevant knowledge and skills in this regard.

LEARNING OBJECTIVES

After studying this unit, you should be able to:

1. Know different types of lens materials and their properties.
2. Know different lens manufacturing techniques, their merits and demerits.

INDICATIVE CONTENT

- 2.1 Contact lens materials and manufacturing techniques

RECOMMENDED LIST OF READING

PRESCRIBED READING

1. Robert Fletcher, Luigi Lupelli and Angela Rossi. Hard Materials. Contact Lens Practice. A Clinical Guide, p 17-32.

2. Robert Fletcher, Luigi Lupelli and Angela Rossi. Soft Contact Lenses. Contact Lens Practice. A Clinical Guide, p 121-130, 137-142.
3. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Rigid Contact Lenses: Basics. The Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. P 289-290.
4. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Soft contact lenses. The Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. P 316-326.

SUGGESTED READING

1. Theodore P. Grosvenor, O.D. Contact Lens Materials and Manufacturing Processes. Primary Care Optometry, Second Edition, p 411-413.
2. Anthony J. Phillips. Lynne Speedwell. Contact Lens Materials. Contact Lenses. 4th Edition, p 50-92.

SELF ASSESSMENT EXERCISES

Given in the reference text.

UNIT 3 :

INDICATIONS, CONTRA-INDICATIONS AND PATIENT SELECTION CRITERIA

INTRODUCTION

It is of utmost importance that the practitioner must determine whether the patient is a suitable contact lens candidate. One has to consider whether the patient is motivated to wear contact lenses, is willing and able to comply with all directions, instructions and restrictions for proper lens wear and care and has appropriate refractive error (i.e., within the range offered by the lens manufacturer). This unit will focus on these issues.

AIMS AND OBJECTIVES

After studying this unit, you are expected to be able to:

1. Know the indications and contraindications of contact lenses.
2. Select appropriate users for contact lens wear.

INDICATIVE CONTENT

- 3.1 Indications, contra-indications and patient selection criteria

RECOMMENDED LIST OF READING

PRESCRIBED READING

1. Robert Fletcher, Luigi Lupelli and Angela Rossi. Contact Lense Typr: Advantages and Disadvantages. Contact Lens Practice. A Clinical Guide, p 6-13.

2. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Soft Contact Lenses The Ophthalmic Assistant; A Guide for Ophthalmic Medical Personnel. Seventh Edition. P 318-322, 341-345.

SUGGESTED READING

1. Theodore P. Grosvenor Prescribing Contact Lenses. Primary Care Optometry. Second Edition. P 417-427.
2. Anthony J. Phillips. Lynne Speedwell. Assessment of patient suitability for Contact es. Contact Lenses. 4th edition, p 258-281.

SELF-EVALUATION EXERCISES

Given in the reference text.

UNIT 4:

Hard Contact Lenses

INTRODUCTION

There are two types of contact lenses: hard and soft. Hard contact lenses come in two forms: non-gas permeable and gas permeable. Gas-permeable lenses allow oxygen to reach the corneal surface, are more flexible than non-gas permeable lenses and are the most commonly used form of hard contacts.

The hard contact lens have their special properties, indications, advantages and disadvantages. This unit will introduce you to the practical knowledge about the hard contact lenses.

LEARNING OBJECTIVES

After studying this unit, you should be able to:

1. Have basic working knowledge about the hard contact lenses and their designs.
2. Understand what is DK value and wettability and the clinical importance of both of these.

INDICATIVE CONTENT

- 4.1 Introduction
- 4.2 Lens design
 - 4.1.1 BOZR
 - 4.1.2 BOZP
 - 4.1.3 BPZD
 - 4.1.4 TD
 - 4.1.5 CT
- 4.3 DK value
- 4.4 Wettability

RECOMMENDED LIST OF READING

PRESCRIBED READING

1. Robert Fletcher, Luigi Lupelli and Angela Rossi. Hard Contact Lenses. Contact Lens Practice. A Clinical Guide, p 17-72.
2. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Rigid Contact Lenses: Basics. The Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. P 217-313.

SUGGESTED READING

1. Theodore P. Grosvenor. Prescribing Contact Lenses. Primary Care Optometry. Second Edition. P 417-427.
2. Anthony J. Phillips. Lynne Speedwell. Assessment of Patient Suitability for Contact Lenses. 4th edition, p 258-281.

SELF-EVALUATION EXERCISES

Given in the reference text.

UNIT 5:

REFRACTION FOR CONTACT LENSES

INTRODUCTION

It is very important for the students to know how to refract for contact lenses in order to prescribe and dispense contact lenses. This unit will inform you about the relevant knowledge and techniques.

LEARNING OBJECTIVES

After studying this unit, you should be able to:

1. Know the principles of refraction for contact lenses.
2. Perform refraction for contact lenses.

INDICATIVE CONTENT

- 5.1 Refraction for contact lenses

RECOMMENDED LIST OF READING PRESCRIBED READING

1. Contact lenses: The Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. P 286-287.

SUGGESTED READING

1. Theodore P. Grosvenor. Prescribing Contact Lenses. Primary Care Optometry. Second Edition. Chapters on Refraction.

2. Anthony J. Phillips. Lynne Speedwell. Assessment of Patient Suitability for Contact Lenses. Contact Lenses, 4th edition.

SELF-EVALUATION EXERCISES

Given in the reference text

UNIT 6:

CONTACT LENS FITTING

INTRODUCTION

Proper lens fit is determined by several factors including lens curvature, diameter and power. The most important factor is that a lens must fit well enough to center properly but not so tight as to limit adequate oxygen supply to the eye. Frequently a lens must be worn for several weeks to determine if the oxygen supply is sufficient and the eye is adapting properly.

You should have the knowledge and practice of the different contact lens fitting techniques in order to avoid the serious problems associated with poor-fit.

LEARNING OBJECTIVES

After studying this unit, you should be able to:

1. Have knowledge of different contact lens fitting techniques and apply these in clinical practice.
2. Identify and solve different problems due to poorly fitting contact lenses and solve those.

INDICATIVE CONTENT

6.1 Contact lens fitting

RECOMMENDED LIST OF READING PRESCRIBED READING

1. Robert Fletcher, Luigi Lupelli and Angela Rossi. Hard Contact Lenses. Contact Lens Practice. A Clinical Guide, p 50-72.
2. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Advanced Techniques in Soft and Rigid Contact Lens Fitting. The Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. P 352-375.

SUGGESTED READING

1. Theodore P. Grosvenor. Prescribing Contact Lenses. Prescribing Contact Lenses. Primary Care Optometry. Second Edition. P 426-456.
2. Anthony J. Phillips. Lynne Speedwell. Assessment of Patient Suitability for Contact Lenses.

SELF-EVALUATION EXERCISES

Given in the reference text.

UNIT 7:

CONTACT LENS SOLUTION AND STORAGE

INTRODUCTION

The key to a comfortable and successful use of contact lenses is the maintenance of the hygiene of the lenses. Neglect of either of these can result in serious consequences regarding eye health.

Therefore, this unit will enable you to understand how to use contact lens solutions and also you will be in a position to educate your patients in future about the contact lens care.

LEARNING OBJECTIVES

After studying this unit, you should be able to:

1. Know different types of contact lens solutions available and understand their properties.
2. Advise the users about the method of using of contact lens solution

INDICATIVE CONTENTS

- 7.1 Contact lens solution and storage

RECOMMENDED LIST OF READING PRESCRIBED READING

1. Robert Fletcher, Luigi Lupelli and Angela Rossi. Lens handling and care solutions. Contact Lens Practice. A clinical guide, p 159-167.

2. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. Sections on cleaning of the lenses.

SUGGESTED READING

1. Theodore P. Grosvenor. Prescribing contact lenses. Prescribing contact lenses. Primary Care Optometry. Second Edition. Sections on contact lens care
2. Anthony J. Phillips. Lynne Speedwell. Assessment of patient suitability for Contact lenses.

SELF-EVALUATION EXERCISES

Given in the reference text.

UNIT 8:

USER ADVICE

INTRODUCTION

You must have already realized by knowing that the role of the user for the desirable results of contact lens use is as important as yours. You have to educate the user about each and every thing regarding the use and care of the lenses.

This unit will educate you about all the steps essential to have maximum benefits of the lens use and avoid the undesirable effects associated with these, so that in future you can educate your patients the same way.

LEARNING OBJECTIVES

After studying this unit, you should be able to:

1. Know the care of different types of contact lenses.
2. Educate the users about the care of their lenses.

INDICATIVE CONTENT:

8.1 User advice

RECOMMENDED LIST OF READING PRESCRIBED READING

1. Robert Fletcher, Luigi Lupelli and Angela Rossi. Patient instructions. Contact Lens Practice. A clinical guide, p 159-167.
2. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. Sections on patient instructions.

SUGGESTED READING

1. Theodore P. Grosvenor. Prescribing contact lenses. Prescribing Contact Lenses. Primary Care Optometry. Second Edition. P 434-435.
2. Anthony J. Phillips. Lynne Speedwell. Assessment of Patient Suitability for Contact lenses.

SELF-EVALUATION EXERCISES

Given in the reference text.

UNIT 9:

CONTACT LENSES FOR SPECIAL PURPOSES

INTRODUCTION

So far, we have been discussing the use of contact lenses in common ocular defects. However, there are certain complicated conditions, where special lenses are used. This unit will discuss these lenses.

LEARNING OBJECTIVES

After studying this unit, you should be able to:

1. Know different types of contact lenses used for special conditions.
2. Apply this knowledge to their clinical practice.

INDICATIVE CONTENTS

9.1 Contact lenses for special purposes

RECOMMENDED LIST OF READING PRESCRIBED READING

1. Robert Fletcher, Luigi Lupelli and Angela Rossi. Patient Instructions. Contact Lens Practice. A Clinical Guide, Sections on Special Modifications.

2. Harold A. Stein, Bernard J. Slatt, Raymond M. Stein. Ophthalmic Assistant, A Guide for Ophthalmic Medical Personnel. Seventh Edition. P 355-368.

SUGGESTED READING

1. Theodore P. Grosvenor. Prescribing Contact Lenses. Prescribing Contact Lenses. Primary Care Optometry. Second Edition. P 449-457.
2. Anthony J. Phillips. Lynne Speedwell. Assessment of Patient Suitability for Contact Lenses.

SELF-EVALUATION EXERCISES

Given in the reference text.