



ERGOPTIX
Magnifying Loupes & LED Headlamps

What are dental loupes?

- Dental loupes are a **pair of magnification lenses** that a dentist wears on his/her head while operating on a patient.
- Dental loupes might have an **attached headlamp** to illuminate that area of a patient's mouth which is being operated upon.



What problems does a loupe solve?

1. Dentist's health

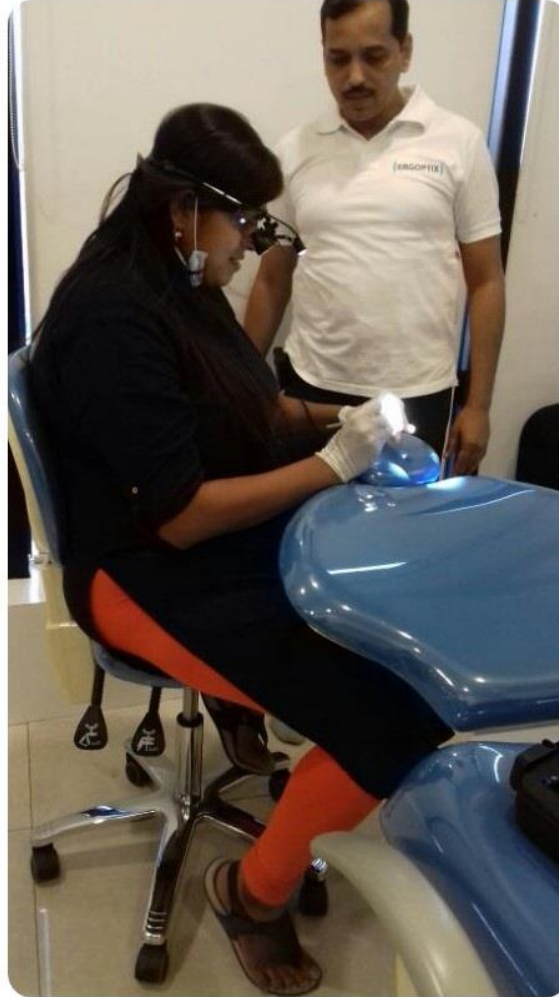
- a) Ergonomics: Relieves back & neck pain
- b) Protection from aerosol droplets and flying debris



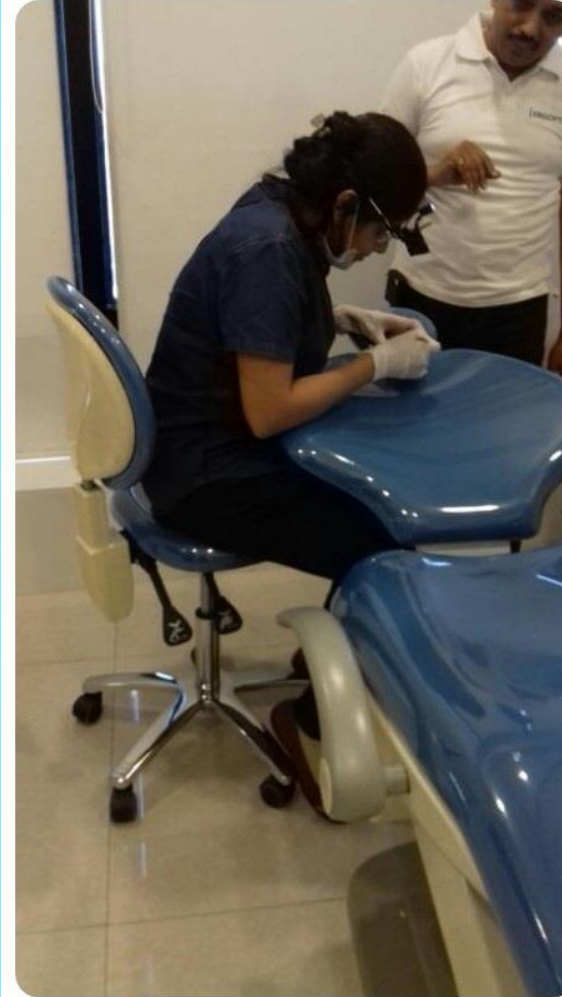
What does posture improvement look like?



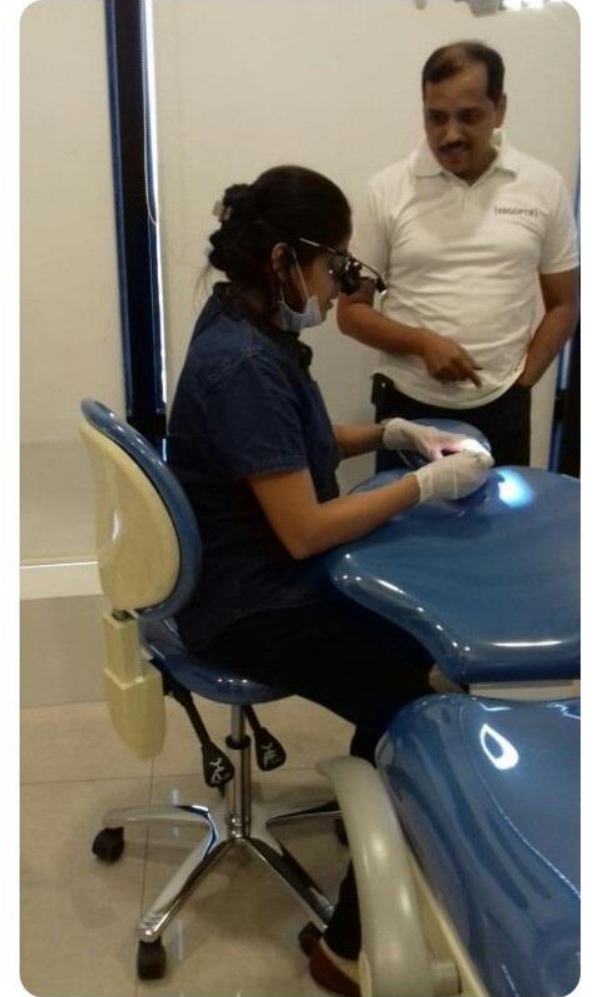
Without Loupes



With Loupes



Without Loupes



With Loupes

What problems does a loupe solve?

1. Dentist's health

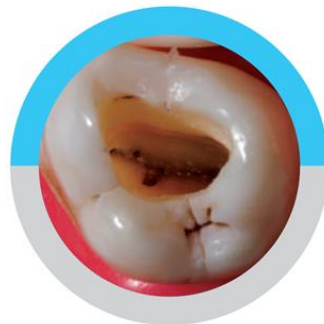
- a) Ergonomics: Relieves back & neck pain
- b) Protection from aerosol droplets and flying debris

2. Enhances dentist's performance

- a) Magnification means better visual information
- b) LED headlamps allow for controlled illumination



Normal view



With loupes



With loupes & light

What problems does a loupe solve?

1. Dentist's health

- a) Ergonomics: Relieves back & neck pain
- b) Protection from aerosol droplets and flying debris

2. Enhances dentist's performance

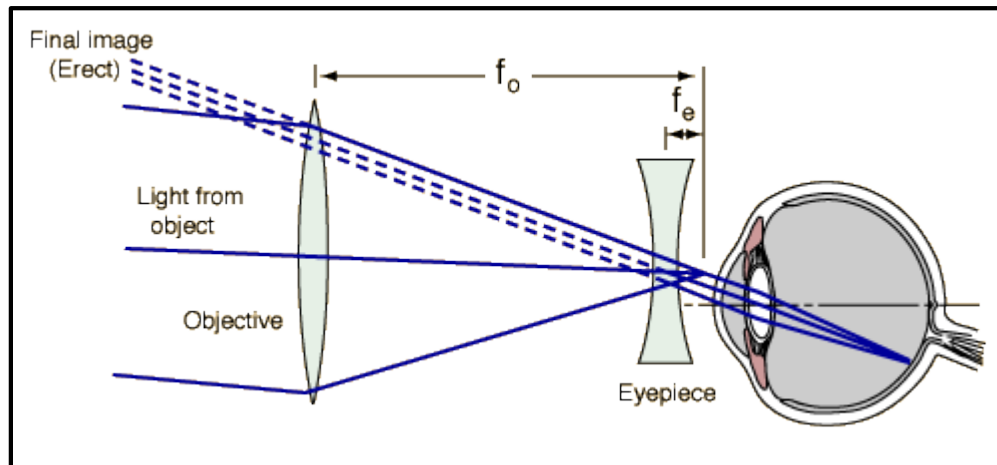
- a) Magnification means better visual information
- b) LED headlamps allow for controlled illumination

Overall: comfort and reduced stress



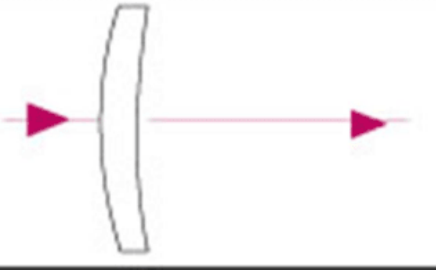
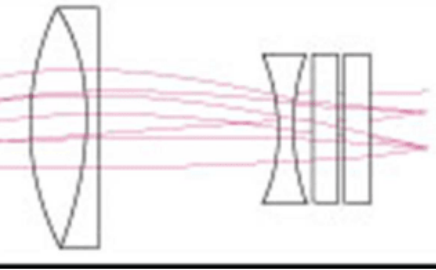
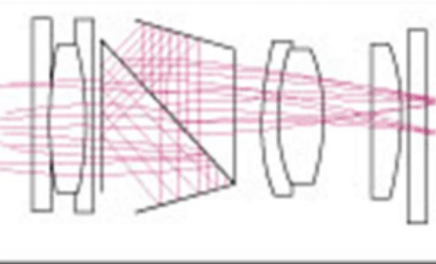
What is inside a loupe?

- The simplest optical microscope is the magnifying glass.
- Dental loupes are a kind of **telescope**.
- The telescope has two lenses:
 1. The ocular, or **eyepiece lens** that the dentist looks into
 2. the **objective lens**, or the lens closest to the object.

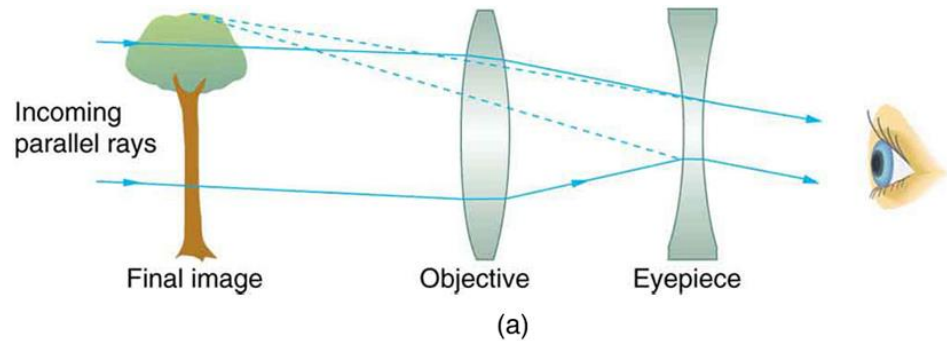


For 2.5x and 3.0x Galilean system is used:
Objective is convex, Eyepiece is concave

What are the other magnification systems?

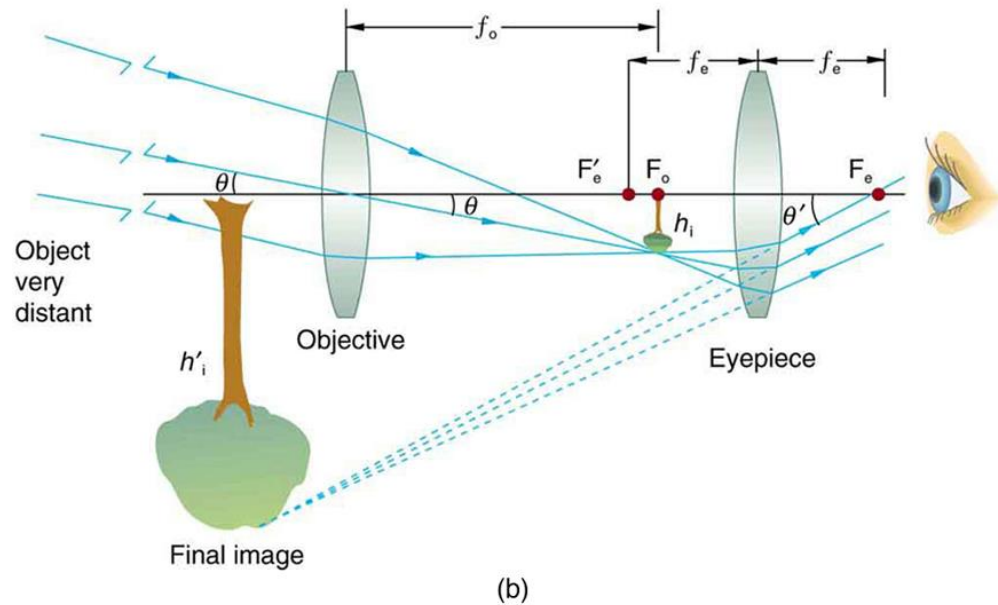
	Single Lens Loupes	Class I Single lens loupes (flat plane).
	Galilean Loupes System	Class II - Between 2.0 & 3.5 power magnification These loupes are usually a Galilean design (from the 17th-century astronomer, Galileo Galilei).
	Prismatic Loupes System	Class III - Between 3.0 & 3.9 power magnification Class IV - Between 4.0 & 4.9 power magnification Both in Keplerian design (from the 17th-century astronomer, Johannes Kepler).

Galilean vs. Keplerian



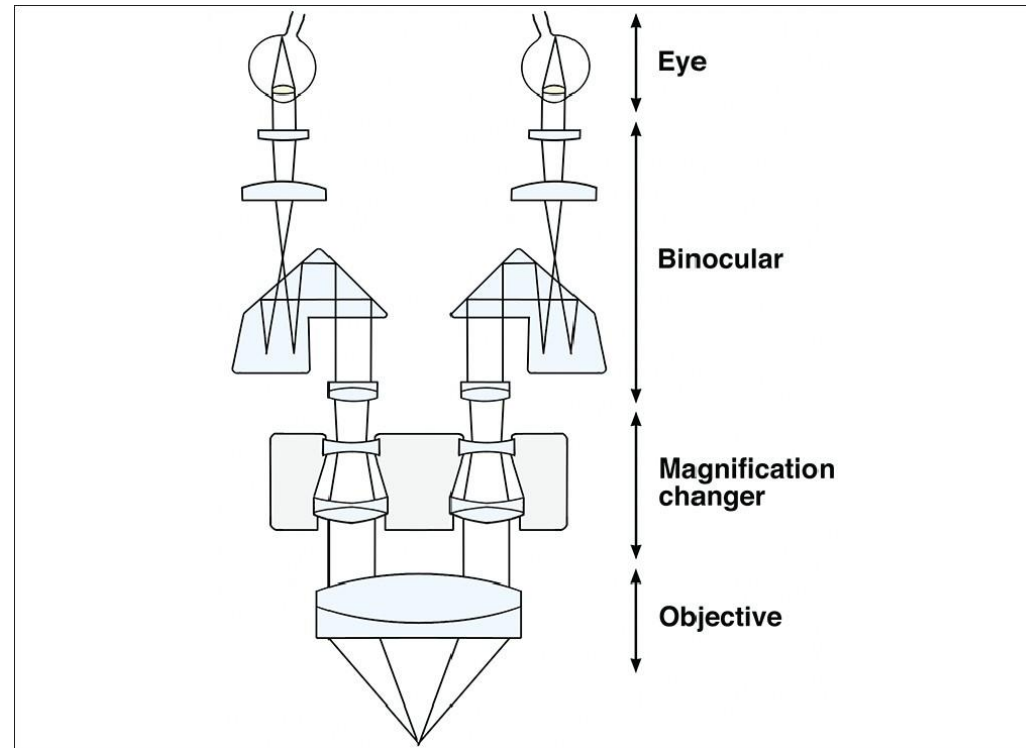
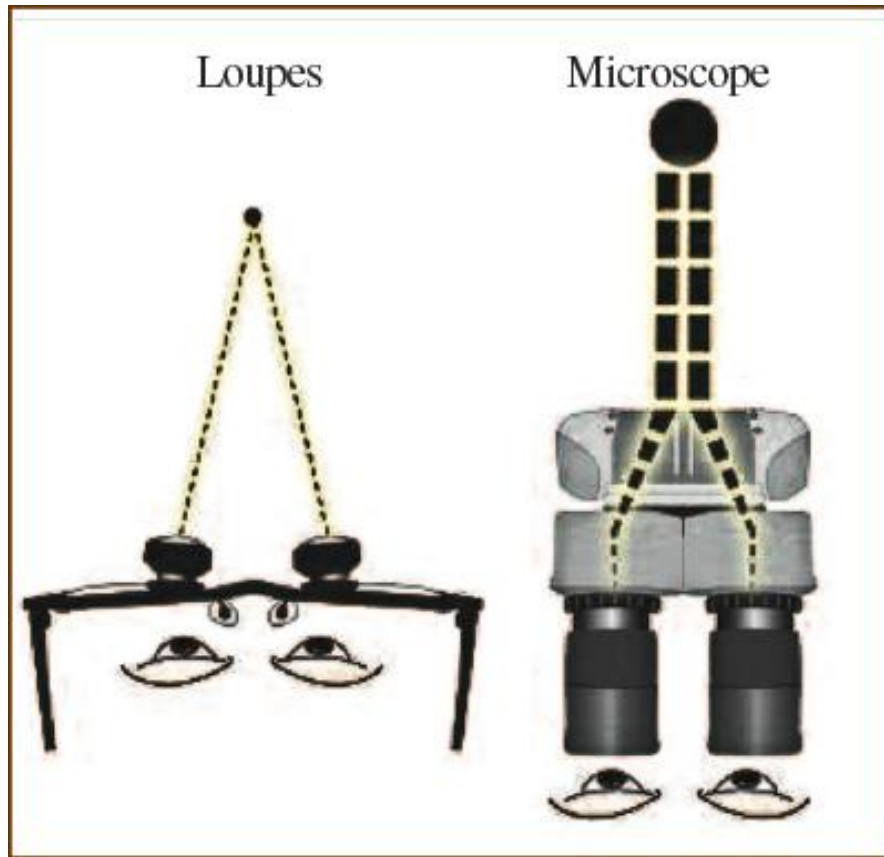
Galilean: light weight, lower magnification

Higher the magnification,
lower the DOF



Keplerian: heavy, higher magnification,
uses prisms to re-invert image (hence
called prismatic)

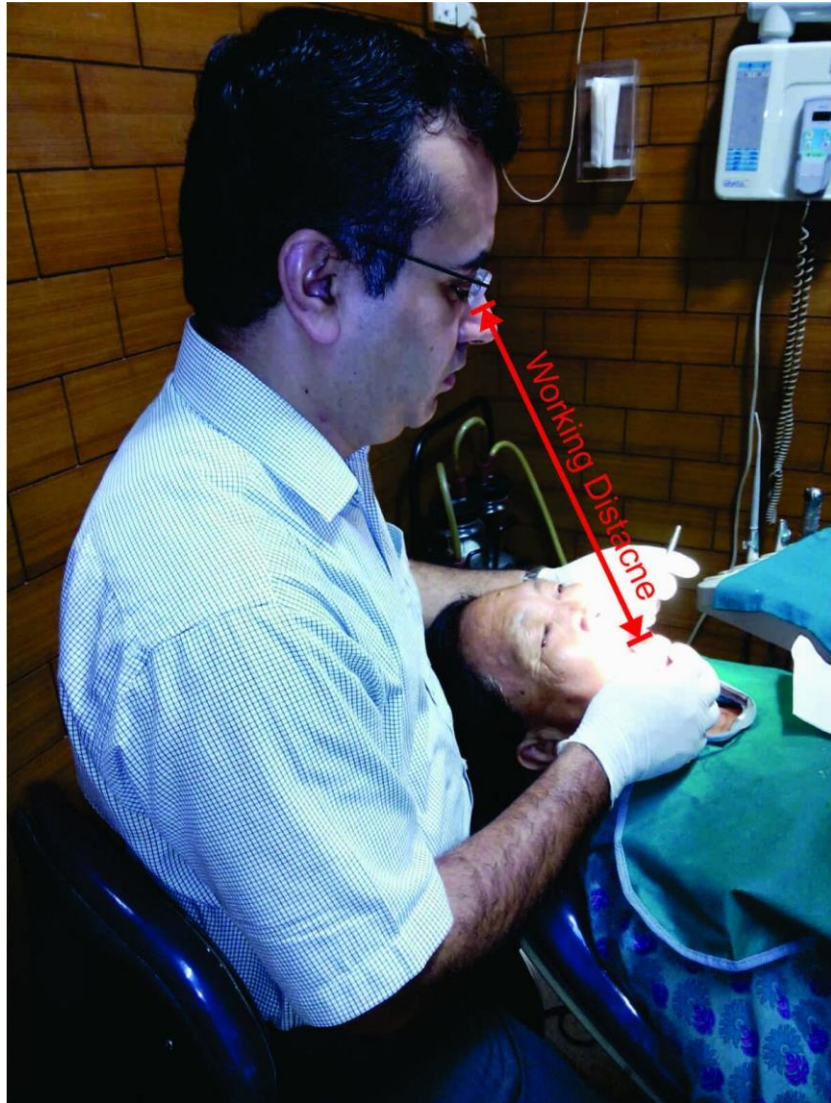
Loupes vs. Microscopes



Do I need to know any parameters before purchasing a pair of loupes?

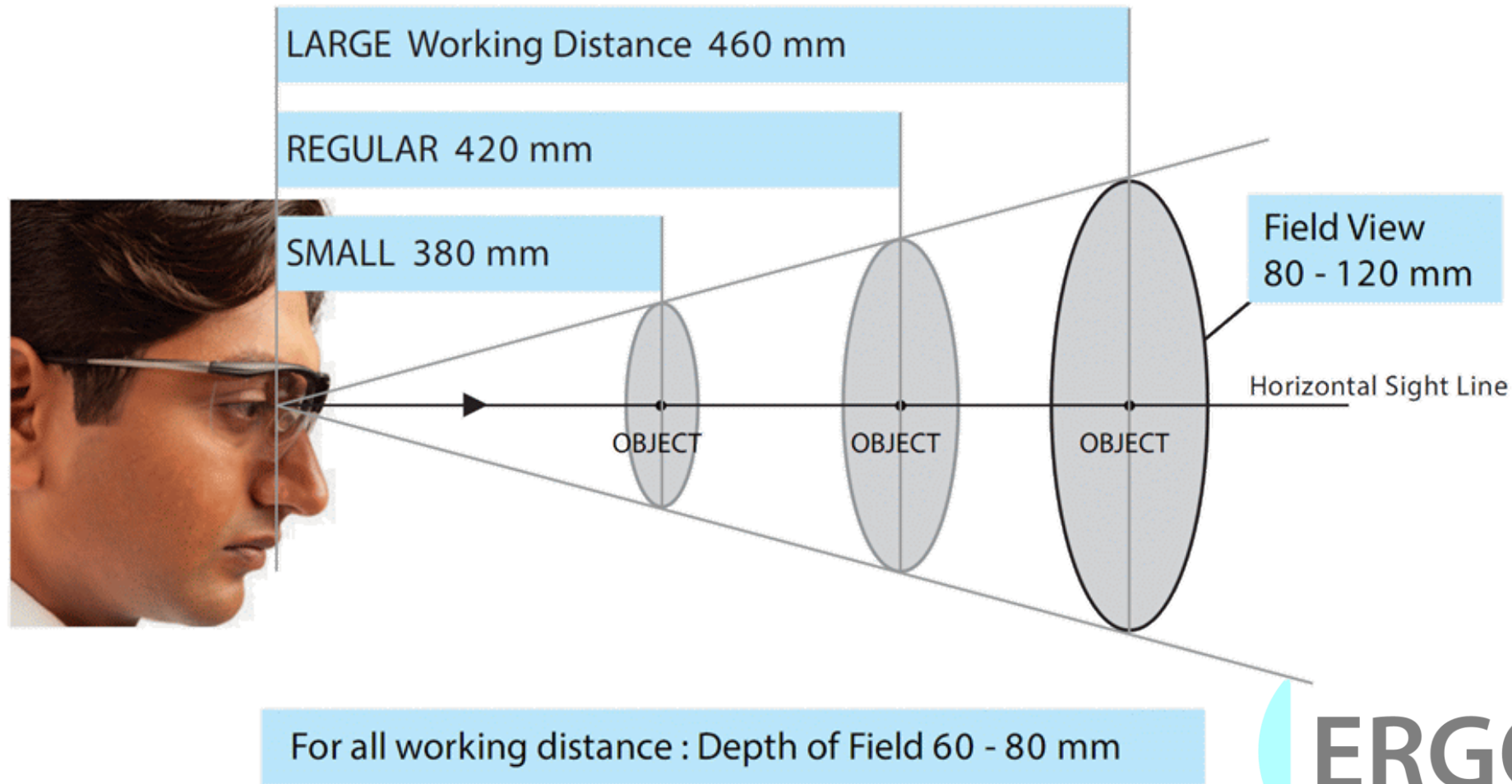
1. What magnification do you want? 2.5x or 3.0x
2. What is your working distance?
3. Do you need a headlamp?
4. Do you wear spectacles?

What is working distance?



- The **distance** between the front edge of the objective lens and the specimen surface (with the surface of the cover glass in case of the cover glass objective lens) when the specimen is focused.
- The working distance roughly depends on your height and the dental chair/stool that you use.

What working distances are available?



What if I wear spectacles?

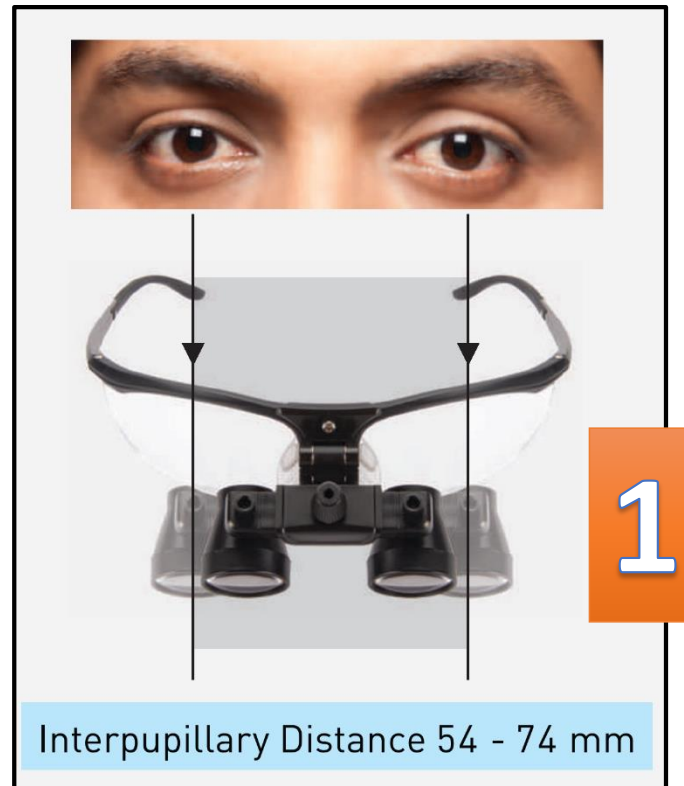
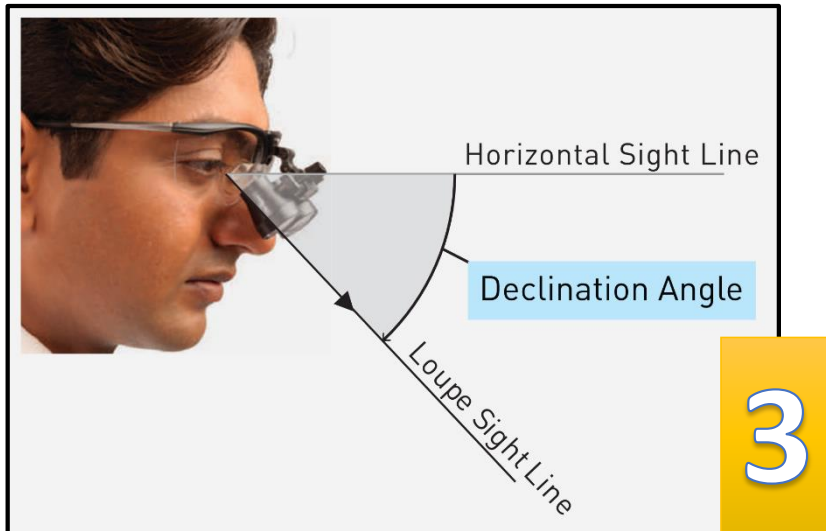


Unscrew the titanium/silicon rubber nose pad and screw in the prescription insert frame.

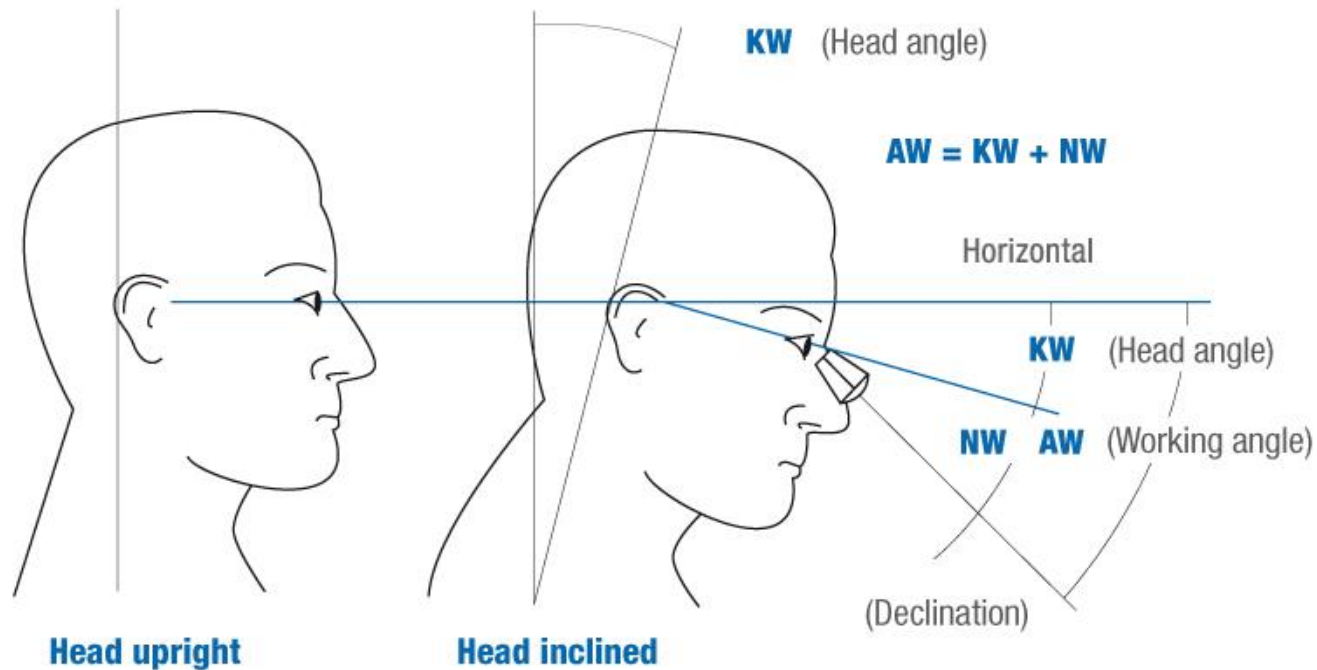
The lenses for the frame can be made by any local optician.

What adjustments can be made to a pair of loupes?

1. Inter pupillary distance
2. Convergence angle
3. Declination angle

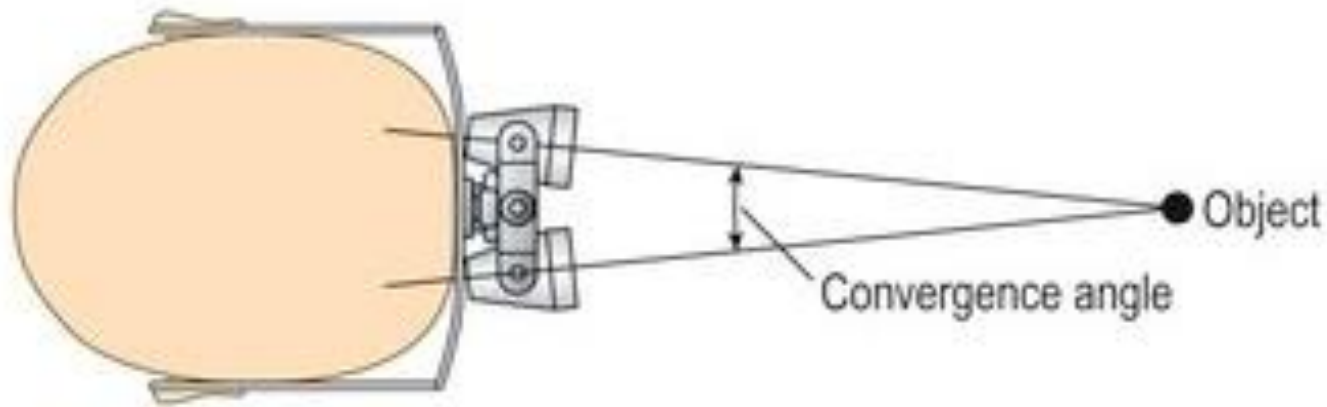


Why is declination angle important?



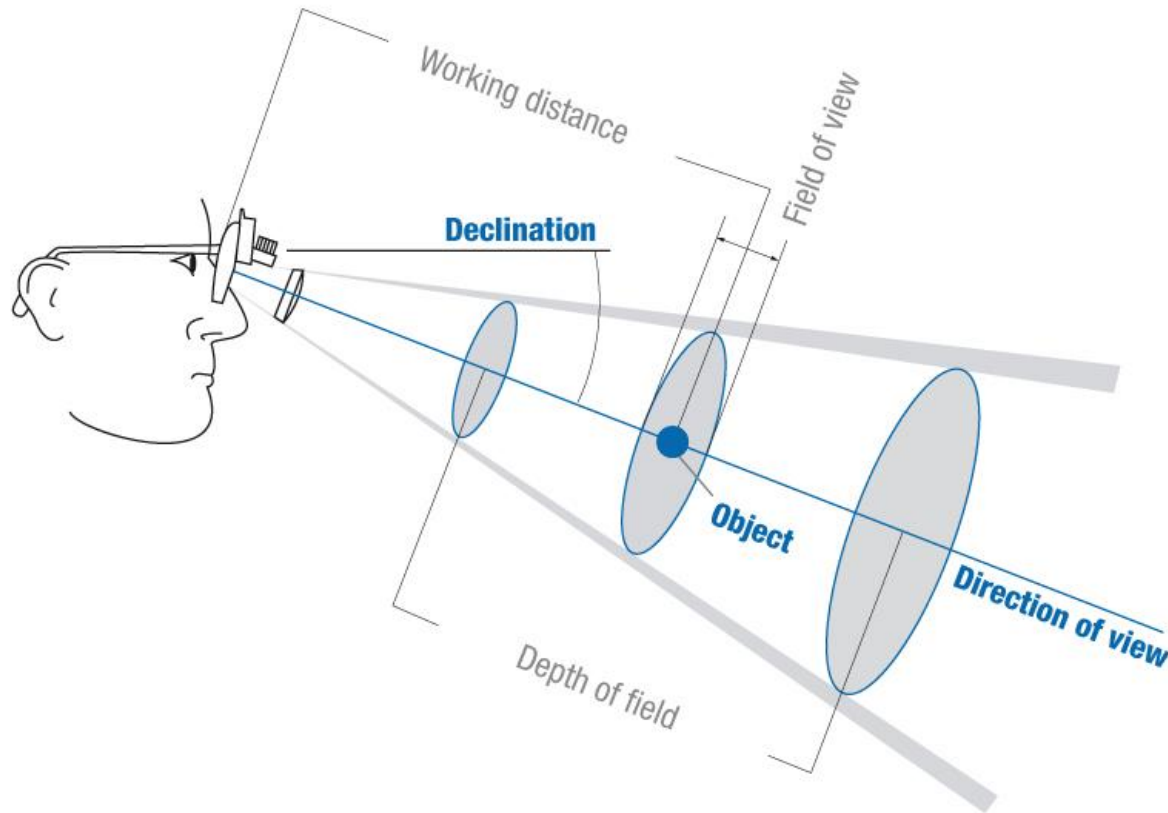
If a loupe's declination angle can be increased, then the head angle will decrease and the possibility of neck strain will be avoided.

How do I adjust convergence angle?



Convergence angle should be set such that the axis of the lens barrels intersect at the point which is “working distance” away from your eyes

What is Depth of Field?



Higher the magnification,
lower the DOF

Depth of field is the tolerance that you have in moving your neck towards or away from the patients mouth.

Summary of parameters of a pair of loupes

- Fixed parameters:

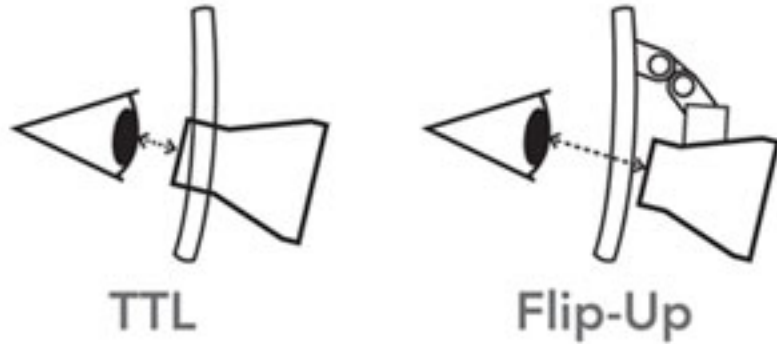
1. Magnification (Can be changed by buying new barrels)
2. Working distance (Can be changed by buying new barrels)
3. Headlamp (Can be purchased separately)
4. Prescription insert and its power (Can be purchased separately)

- Adjustable parameters:

1. Inter pupillary distance
2. Convergence angle
3. Declination angle



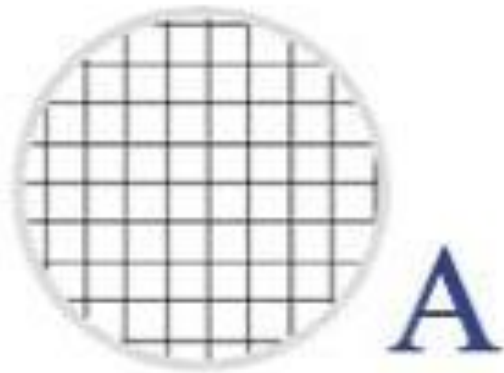
Which is better? TTL or Flip-up



TTL disadvantages:

- Barrels cannot be flipped up to switch to normal vision – they have to be taken off completely.
- Declination angle cannot be adjusted.
- In Husband-Wife clinics, loupes cannot be shared.

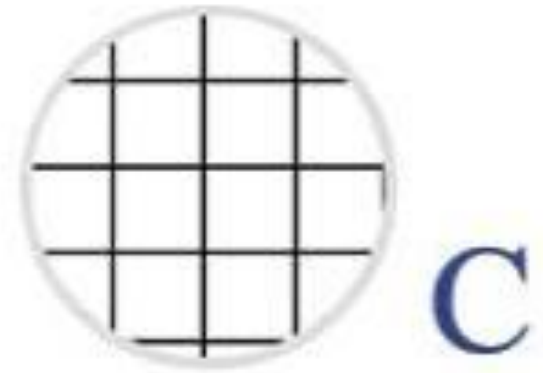
How can I tell if a given set of loupes are of good optical quality?



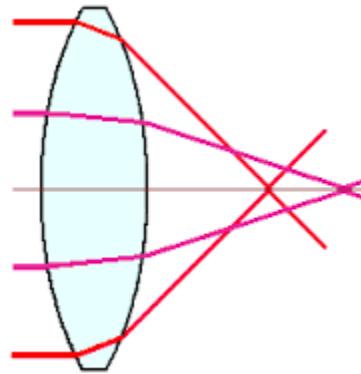
A. Low Resolution



B. Spherical Aberration

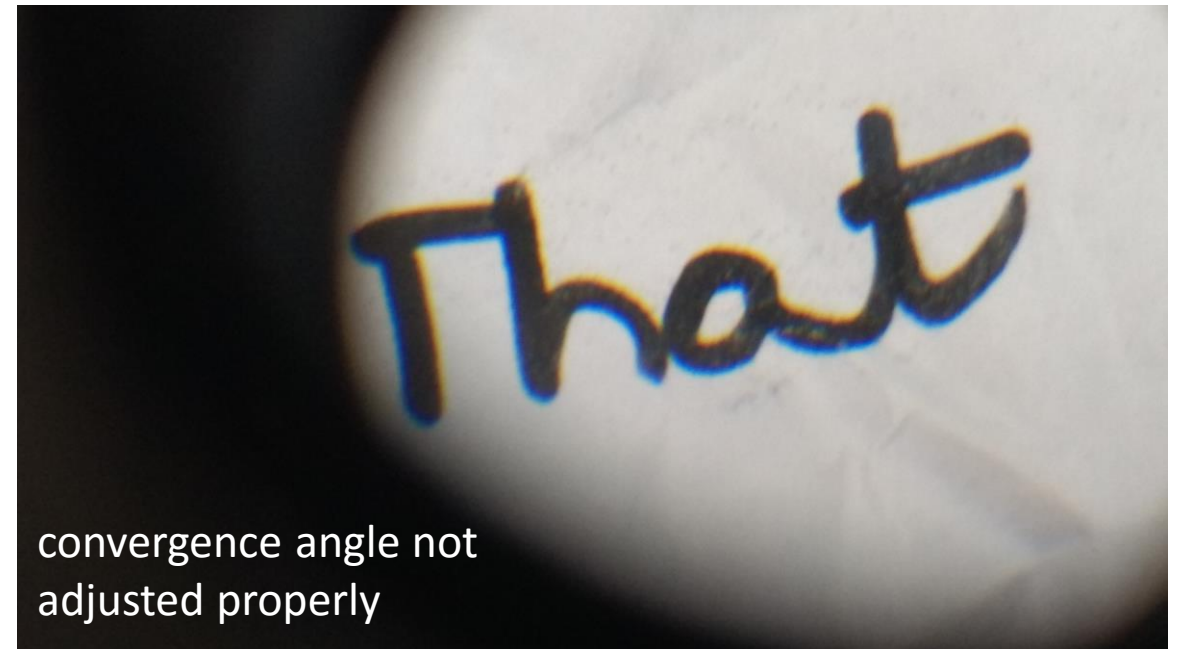
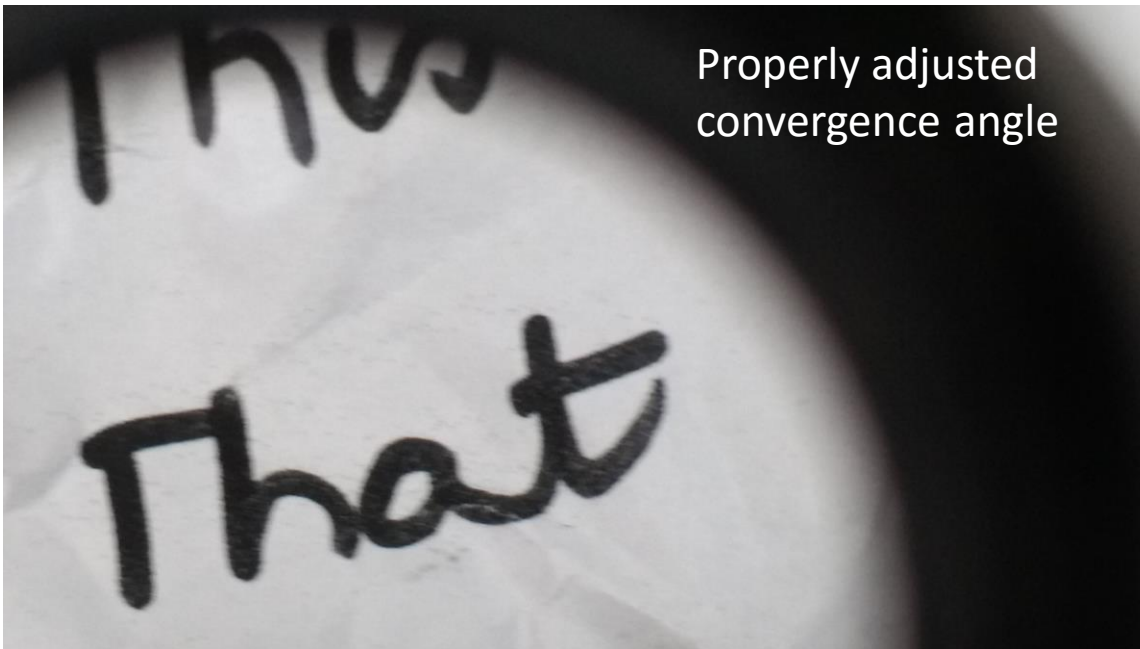


C. High Resolution and no Aberration

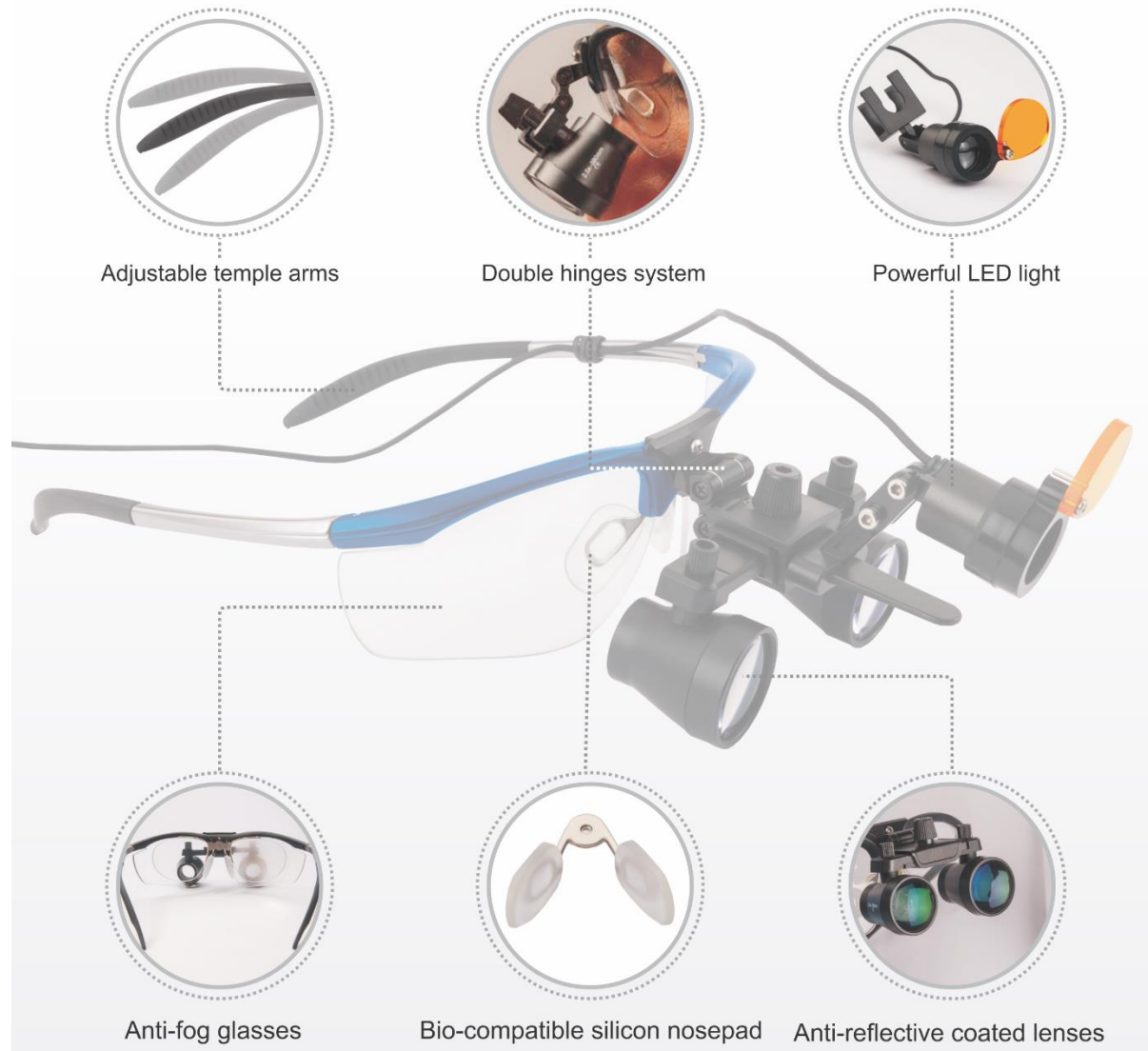


What's the relation between convergence angle and chromatic aberration?

- If you don't set the convergence angle properly, the lens from the two barrels will not compensate each other and chromatic aberration will be apparent especially in case of 3.0x



What enhancements do Ergoptix loupes have?



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6 enhancements

What accessories are supplied with Ergoptix loupes?



Why would I need washable lens covers?



4 Step intensity
controller

Pr



Washable lens cover



7500mAh
Battery



Adapter
clips



Curing
filter

To protect the lens system from aerosol spray and flying debris. Lens covers should be cleaned regularly.

Why would I need flip up paddle?



4 Step intensity
controller



Prescription
insert



Le



Flip-up paddle



Adapter
clips



Curing
filter

To switch between normal and magnified vision quickly without taking off the loupes.

Why do I need adapter clips?



4 Step intensity controller



Prescription insert



Lens covers



Flip-up paddle



ng
er

Adopter clips

Ergoptix loupes hold the LED lamp on its paddle handle. If you want to use LED headlamps with other spectacles/loupes, you can use these adapter clips.

Why would I need a curing filter?



4 Step intensity
controller



Prescription
insert



Lens covers



Flip-up
paddle



7500mAh
Battery



Curing filter

The LED headlamp is powerful. The curing filter blocks out those light frequencies which may otherwise cure the **light curable resin composites** unintentionally.

Does a good LED Headlamp have any quality parameters?

Ergoptix LED Headlamps have:

- **Color Rendering Index greater than 90**
The variation in intensity and color of the light would not change more than 5% over the lifetime of the LED headlamp (~10,000 hours)
- **Color temperature is 5500 to 6000 Kelvin**
the mixture of light that comes out of our headlamp is very similar to the light coming from the Sun.
- **Special lens for spot focus**
Will not disturb patient's eyes.
- **Curing filter included**
- **Intensity Adjustment – 6 levels**



How do I carry the battery pack? How do I charge it?



The **battery pack** can be clipped on to your trousers or apron. It can be charged using the included charger or a regular smart phone charger or even a computer's USB port. The **intensity controller** clips on near your collar.



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How will I find my working distance, my magnification needs and prescription insert?

- Magnification:
 - First time users should go for 2.5x magnification.
 - Once they are used to it, they can switch to higher magnification by purchasing only the 3.0x lens barrels and installing them on to their existing loupes
- Working distance:
 - We can guide you over WhatsApp to help you measure your working distance.
- Prescription insert:
 - Consult with an optician and send us your prescription card and we will get the lens made and sent to you

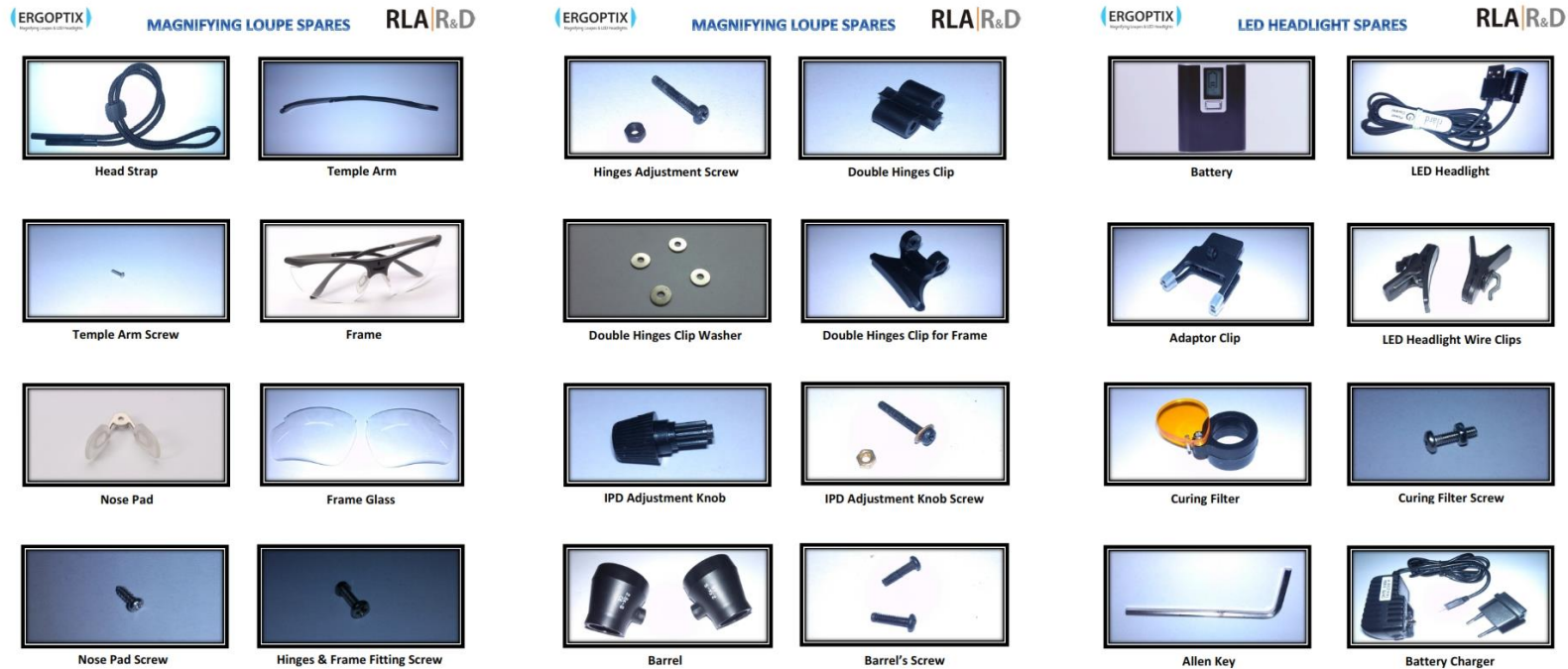
What precautions do I need to follow while caring for my pair of loupes?

- Never attempt to sterilize loupes by any method!
- Never soak loupes in any solution – not even water!
- Never place loupes in an ultrasonic cleaner!



Warranty and spare parts?

- Life long support for replacement of any parts.



There seems to be a learning curve. How long does it take to get used to these loupes?

Advice from existing users of Ergoptix loupes:

1. Use the loupes initially on extracted tooth or cast to build your skill and get used to the loupes
2. When you begin using loupes while operating on patients, start with simple procedures like scaling and examination and then slowly graduate to more complex procedures.
3. Initially use the loupes daily for up to 30-40 minutes at a stretch with twice the amount of breaks between usages. Perform some procedures with bare eyes as well.



There seems to be a learning curve. How long does it take to get used to these loupes?

Advice from existing users of Ergoptix loupes:

4. Understand that it is natural for your eyes to take time to adjust back to normal after using loupes for an extended period of time. Over time you will realize that this not a deal-breaker. You will automatically fall into the habit of giving yourself time between two loupe assisted procedures.
5. Dentists suffering from migraine may take a little more time to adapt, being patient with yourself is the key.



Thank you!

Ergoptix is an **RLA** | **R&D** initiative

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