Duggan Oral Design Resource

The Use of Loupes in Dentistry

INTRODUCTORY:

This is a big topic that has mystified many students and practitioners for decades.

I bought my first pair of loupes in 1988 from an optometrist who was a neighbor. They were Karl Zeiss Jena (yes made before the Berlin Wall came down). The magnification was 2.3 and the working distance was 10 inches – although I should say IS, because I still use them at home occasionally.

I have had MANY pair of loupes over the decades – mostly because vendors would present them to me to use – and IF the vendor paid attention to my specifications, they were usually functional.

BUT – I have seen an alarming increase in the number of my students who have bought loupes before taking my classes, and find themselves with loupes that are essentially USELESS to them, and they are beyond the date when the vendor will do something about it.

This makes me angry, because often times these loupes cost a LOT of money, money that most students entering into dental school cannot really afford.

I am writing this article to make sure that MORE new dentists and dental students take MORE into account before they invest in loupes.

I HATE to say this, but from the loupe manufacturers that I have worked with in the past, there is a strong tendency to SELL loupes that are not necessarily in the wearers best interests! There have always been “studies” and “articles” that people have written about ergonomics, and how loupes can help you achieve a better position in your work, for better body health.

This CAN be true, but more often than now I have seen my students struggling to see anything at all, with any comfort at all. And the sales reps are guided by the “corporate dialectic” into selling a particular loupe design.

I will have more to say later about WHY people often purchase the wrong loupes, but we need to look in more detail FIRST at WHY we want loupes in the first place!

WHY WE WEAR LOUPES

This is really simple – we wear loupes so that we can SEE MORE!

Now the sales reps will have us believe that we wear loupes so we can work in a better position, BUT we still need to see more IN that position.

Loupes have ONLY two attributes that we need concern ourselves with for this discussion – magnification and working length. Flip-up versus TTL, sport frames, head bands, adjustment devices – all of these things are important decisions that need to be made – BUT, it is ALL about what we can see – not really about how we LOOK. Of course, you want to look your best – so those Italian loupes may appeal ….

BUT – the CRITICAL thing is that we MUST SEE our work at a level of magnification that ALLOWS us to see the smallest errors that can reduce the lifetime of the restoration! That is the bottom line! There are errors at the .1 mm level that will distinctly shorten the lifetime, and anything shorter than the EXPECTED lifetime, is a failed procedure.

SO – HOW do we see at that level? Magnification and working distance. The greater the magnification the more we see, obviously. BUT, many people forget that the greater the working distance, the LESS we see!

I can work will at 3.0 x at 12 inches, but for the same magnification at 14 inches I do not see enough. I've never tried to quantify it, but it seems that two extra inches distance is the equivalent of losing ONE power in magnification.

So – we wear loupes to see more, but spending $3000 on a pair of loupes does not guarantee that you WILL see enough.

MAGNIFICATION AND WORKING DISTANCE

Again – it is the combination of magnification and working distance that allows you to see what you MUST.

The first decision is NOT what magnification, it is what DISTANCE you want to work at. The typical sales rep will tell you to keep the distance long – and I totally disagree with this.

The typical ergonomic statement that a long working distance will keep your back more vertical is correct. BUT – what about your NECK – more dentists have trouble with their neck.

What causes trouble with the neck? Working with a bent neck – looking DOWN.

With a long working distance the patient tends to be lower down toward your legs – in your lap. This is the case unless the distance is SO long that you have to have them out around your knees. I've had students come in with 18 inch working distance loupes that just could not get the patient in a workable position.

But – if the patient is down toward your lap at 15 inch working distance, CAN you look toward the patient without bending your neck? Perhaps, IF the declination angle of the loupes is really steep – in other words, your eyes look far downward at a steep angle. You face points horizontally but your eyes point downward. There are limits to how far you can look downward.

Even if the angle of the lenses is steep, will your EYES feel comfortable at such a steep angle hour after hour? There are even some loupes that have a bent optics, so you don't have to look down too steeply, yet the lens looks downward for you. I have never used these, but it doesn't seem as though it would feel natural. But, I'll reserve judgement until I try them.

On the other hand – IF you decide to work at a long distance, for whatever reason, to SEE enough you will need a high magnification. Simple loupe optical design, Galillean loupes, can produce magnifications up to 3.5 at the most. If you want to be working at 15 inches, or the sales rep recommends it and you accept that, you will need more magnification than that.

Loupe optical design that provides more magnification is the prism design – these are far more complex, heavier, bigger and much more expensive.

Again – I hate to say it – but honestly I have occasionally thought that sales reps that work on commission recommend long working distances so they can sell more prismatic loupes that cost about $1500 MORE than the Galilleans.

So – the patient position issue needs to be considered more carefully.

I've been working at 10 – 11 inches for 35 years. How do I not have neck problems? I bring the patient or the manikin closer to heart level, with my forearms fairly horizontal and thus don't have to bend my neck OR keep my eyes at a steep declination angle.

For many years I had an Orascoptic representative come to my offices to sell loupes to my students – and he sold over 1500 pair at 2.5 power and 10-12 inches working distance. The students found them to be quite satisfactory.

HOW TO DECIDE WHICH LOUPES?

Are you comfortable working with the patient 10-12 inches away? Without loupes most students work far closer – maybe even 8 inches is possible with those young eyes! Moving a little farther away and getting modest magnification will allow you to see what you must.

Do you have $500 to spend on loupes or $2500? Don't fall into the trap that if you are starting at a school and have a nice shiny new student account (think: an almost limitless credit card) that you won't have to pay for them eventually. In fact, if you take 10 years to pay off your student debt at a 7% APR, you will pay TWICE the initial cost of the loupes over that 10 years. Now those $2500 loupes cost $5000!

OK – so you need to TRY some loupes – but try short ones! Try lower magnification at lower working distance. You will probably find them very suitable, just bring the patient or the manikin up a little higher so you don't bend your neck and all will be well.

Do NOT believe what a random sales rep tells you – they don't know what it takes to DO dentistry!

OTHER FACTORS

The LIGHT is a big issue.

My first light was a quartz halogen – could burn a hole in your forehead.

My second light was from Zeiss, made to fit exactly between the lenses of the loupes. It was fiber optic, but the light source weighted about 12 pounds.

After that LED lights came into being – and everything changed.

Lights are one of the most valuable aspects of wearing loupes – they provide a place to connect the light!

BUT – careful where you position the light. Virtually everyone has it positioned ABOVE the plane of the lenses – and this is exactly where you to NOT want it placed! Any position out of the plane of the lenses will cast a shadow for certain procedures.

Most connectors between the light and the frames of the loupes can be positioned in two ways – and most people think the higher position is where it should be. Even the manufacturers seem to think so – but you can usually flip it over so the light is closer to the lens plane – and you will see MUCH better.

Flip up or through-the-lens.

If you can flip the lenses out of their position in front of the glasses lenses, then you can look through the glasses as usual and see everything. In the working position you will have to look AROUND the lenses to see things on the chair-side table or anyplace else. Most people can accommodate flip ups will and even get used to leaving them down and looking around.

Through the lens loupes are permanently fixed into the glasses lenses at your interpupillary distance and do not have to be adjusted like the flip ups. You will ALWAYS have to look around the lenses to see other things, but most people get used to that well.

Through the lens loupes are much lighter, especially for the Galilleans, but the cost is somewhat higher. Flip ups rely on an adjustment mechanism so that anyone can use them independent of interpupillary distance – and sometimes the adjustment mechanism is poorly made.

At the least, the adjustment mechanism of the flip ups will generate more weight. But, the mechanism should adjust smoothly and stay where it is put, AND the convergence angle between the two lenses should be FIXED firmly. Cheaper loupes with cheap mechanisms allow the lenses to rotate away from each other, making another adjustment required before they are useable, and maybe require frequent adjustment.

I have used flip-ups for most of my professional career, and find them quite acceptable – but this is a decision that is far less important than the magnification/distance decision.

Prescription inserts or glasses lenses?

There are some manufacturers that have a clip-in insert carrying your prescription, so that you can use any loupe magnification or style and see clearly around the lenses if you do not have perfect vision. This is especially helpful if you are far sighted.

For the through-the-lens loupes or the flip-up you can also get the glasses lenses made with your prescription, but to change it you will need to have the loupes remade.

STYLE?

Most manufacturers have both sport type, which wrap around the eyes a little more, or plane frame glasses style – looking more like reading glasses. This is clearly a personal preference, but the sport frames tend to be a little more like safety glasses in configuration and likely provide more protection to the operator.

Some companies offer frames designed by well known European designers, but again you have to decide what is most important to you.

BOTTOM LINE:

I would strongly recommend 2.5 – 3.0 power loupes at 10 – 12 working distance. For light weight the through-the-lens is great, but make sure the light that is designed to connect to the frames will allow positioning BETWEEN the lenses. Sport frames likely protect your eyes the most, or you need to use side shields on regular frames. You don't need to spend $1200 for a light system as several of the largest manufacturers charge.

Shop around, know what you want, experiment with different types, magnifications and working distances.

In our classes we make it possible for every student to get used to using loupes – so when the DO buy loupes they know precisely what they want and do not get unduly swayed by the sales rep!