

The Eye as a Specialized Joint Adapted For Sight

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While a student at the Pennsylvania College of Optometry, several of my clinical instructors in the course of making a point about caring for the whole individual would be fond of saying that a pair of eyeballs never walks into your office. I found myself repeating that to students when it was my turn to instruct there, then at the SUNY College of Optometry, and in my current role as a private practice residency site supervisor for SCO. From conversations with colleagues around the globe this appears to be a universal mantra, and it is generally a good one. Yet at some level the concept that a pair of eyeballs never walks into your office can be misleading. How so?

Stating that a pair of eyeballs never walks into your office is meant to convey the interconnectedness of the eyes with the rest of the body, and its implication in overall function and well-being. A medically oriented optometric physician might emphasize that the eye is a window to the body from a systemic disease standpoint. A behavioral or developmental optometrist might emphasize that the eye is a window to the soul from a psychodynamic point of view. Through the years these two apparent camps have often seemed to be at odds with what has been termed the structural versus functional divide, and it has been counterproductive. One group says to the other in a denigrating fashion that they are “just eyeball optometrists”. The other group counters by saying that the medical model is a proud badge of enlightenment. Perhaps looking at eyeballs differently can help us seek middle ground.

Many years ago I became intrigued with the way the eyecare field approached dry eyes. The earliest treatments were attempts to lubricate the eyeball with drops, but this often proved to be inefficacious because the drops evaporated too quickly and provided only temporary relief. Then came more viscous drops and ointments that would stay in contact with the eye longer but proved unsatisfactory because it smeared vision and left a residue on the eyelashes and lid margins that would clog the glands. This was followed by punctual plugs, a clever idea to limit the natural drainage of waste products from the anterior segment through the puncta and pool moisture around the eyeball. As an interesting aside, these methods were adopted well in advance of any scientific studies that they worked any better than placebo treatment. It would have been easy to design a prospective, double blind, masked trial of punctual occlusion. An examiner could be insert a collagen plug into the punctum of one eye, and in the fellow eye tamp down with a forceps as if inserting a plug but in fact insert nothing. The patient would have no idea which eye received the plug, and after three days when the plug dissolves another examiner, blind to which eye received the plug, would repeat the baseline dry eye findings providing objective evidence of whether one eyeball looked or functioned any differently than the other. To my knowledge this simple study was never done.

The challenge of dry eyes persists to this day largely because we have renamed its many iterations, and expanded therapeutic modalities, but have not fundamentally changed the paradigm of how we treat the condition. Dry eye morphed into ocular surface disease, dry eye syndrome, lid wiper epitheliopathy, meibomian gland disease, and a variety of associated conditions that addressed the eyeball and its appendages but overlooked a nagging problem. All of these approaches treated the problem as issues of the eyeball and its external structures. The

fundamental approach remained the same: clean and treat the lids with scrubs, pads and medications, and keep the eyeball surface well lubricated. But what about the mantra that a pair of eyeballs never walks into your office? That should have propelled us to look beneath the surface. Perhaps the clue to effectively treating this multifactorial problem would be treating the eye from within, from the body in which the eyeballs reside, rather than principally treating the problem superficially or externally.

This would be perfectly logical if we looked at the eye in a broader context, as a ball-in-socket joint system. After all, the eyeball or globe is a non weight-bearing pivot joint interfacing with its socket or orbit, is it not? There was support for this point of view in a textbook co-authored by Watson, Hazelman, Pavesio and Green who wrote:

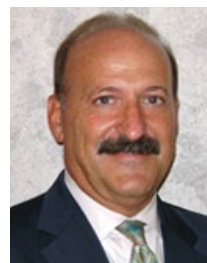
"It has long been recognized that conditions which affect the joints also affect the sclera. Superficially there is little resemblance between the structure of the joint and that of the sclera except that both consist of collagenous tissue and are acted upon by muscles. However close inspection reveals many similarities. *It is not too far-fetched to suggest that the eye is a highly specialized form of joint which is used for seeing.*"¹ In fact, there were many more similarities than differences. Tendons, sheaths, ligaments, pulleys, capsules, and fat pads found within the orbit of the eye are all basic accessory joint structures, and in particular are properties of synovial joints that require significant lubrication. The eye, in fact, is the only joint space in the body that is directly exposed to air, so that its need for lubrication is at a premium.

It is no coincidence that terms used to describe wear and tear of the anterior segment, such as pannus and erosion, stem from rheumatology and in particular synovial joints hinged on visco-elastics. Ocular surface disease often has its origins beneath the surface, and the latest formulations of drops and gels acknowledge this by incorporating hyalruonic acid, a basic ingredient in the synovium. After many years of treating dry eyes as pairs of eyeballs that walk into the office, treatment for dry eye disease now incorporates the same lifestyle recommendations for controlling inflammation and dryness in rheumatology – bolstering the visco-elastics from within. This includes increasing fluid intake, omega 3 fatty acids, cod liver oil, fresh fish, exercise and other anti-inflammatory measures instead of primarily applying anti-inflammatory and hygienic treatments externally.

My intent in this lengthy exposition about eyeballs is to demonstrate how taking a global point of view leads us to middle ground. It allows us to acknowledge that within developmental and rehabilitative optometry there is room for various models, and that the most efficacious approaches and treatments are usually the ones that stand the test of time.

REFERENCE

1. Watson PG, Hazelman BL, Pavesio CI, Green WR, eds. The Sclera and Systemic Disorders. 2nd edition. Oxford: Butterworth-Heinemann 2004, p.15.



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