RAYMOND IEZZI: I'm Dr. Raymond Iezzi, a vitreoretinal surgeon at the Mayo Clinic here in Rochester, Minnesota. I'd like to talk to you today about our experience with macular hole repair. Macular hole is a common entity that we see regularly here at Mayo. And we've developed some new methods for repairing these holes that do not require patients to maintain face down positioning.

One of the common features of patients presenting to us upon referral with macular hole is their anxiety associated with how are they going to maintain face down positioning. Either upon referral, they were told that face down positioning for a week or so is going to be critically necessary, or upon reviewing the literature or what they found on the internet, they've learned that face down positioning is a critical feature of macular hole surgery and for successful outcome. The dynamic that goes on is that a patient is told by a surgeon that the hole will be repaired, however face down positioning will be necessary for a good outcome. And that presents a tremendous burden on the patient because they feel at that moment that the responsibility of a successful outcome is predicated on their ability to maintain this very unnatural and very uncomfortable position. So many times I have to spend time talking to patients about their anxiety and about the fact that face down positioning is in fact, not necessary for a successful outcome in macular hole repair.

We published a series of 68 consecutive cases, no exclusions, all comers were included, including several patients with recurrent macular hole, those with giant macular hole, and some macular holes that were even up to 20 years in duration. We've had 100% success rate with a single surgery in repairing these macular holes. And none of our patients have required face positioning. Why is this the case? And what is different here at Mayo?

Well, we've understood more and more about the dynamics of macular hole, how they form, and more importantly, how we fix them. It's clear that macular hole is no longer in idiopathic process. We understand that it's an abnormal vitreoretinal interface that injures the foveola and evulses it, and causes a macular hole. Because the retina is normally under stretch, particularly in the macular region, and because the foveola is the thinnest part of the retina, and because the vitreous is more firmly adherent at the foveola, this is a susceptible zone of the retina, and is prone to macular hole formation. So we know that it's an abnormal vitreoretinal interface that causes this macular hole initiation.

The body's healing response after a posterior hyaloid separation can then cause tangential traction within the retina, causing the edges of the hole to stretch open. And so that's where the role of surgery comes to play. The dynamics of closing the hole are fascinating. And it turns out that when there is a membrane on the surface of the retina, either an epiretinal membrane or a contracted internal limiting lamina, that changes the mechanical characteristics of the retina, and the retina can no longer relax into its natural closed whole state.

So one of the primary objectives of our surgery is to restore the retina's mechanical compliance by membrane peeling. And so we do a complete membrane peel of any epiretinal membranes, and we also do a very broad internal laminate peel. And removal of the internal limiting membrane, an epiretinal membrane allow the macular hole to close because the retina is naturally a compliant structure.

More importantly than this is an excellent vitrectomy. Meticulous vitrectomy allows us to achieve an excellent gas fill. And the gas is the critical feature in allowing the macular hole to close. The surface tension of the bubble that we put in the eye acts like a plug on the inner aspect of the retina. And it's actually the retina pigment epithelial pump that causes the retinal edges to appose.

And as long as we can maintain this Band-Aid like configuration between the intraocular gas tamponade and the retina itself, the macular hole will heal in a closed position. Because of our meticulous vitrectomy, we get about a 95% gas fill on post-operative day one. And we simply ask patients to read or watch television. We ask them to be seated most of the day.

And this limited mobility reduces convective currents in the eye. And it allows that gas bubble to act as a Band-Aid while that macular hole heals in the closed position. Patients have told us that this was night and day, this was a game changer for them. In many instances patients who formerly had not undergone macular hole surgery were able to undergo the procedure and have successful outcomes.

We've had many patients fly in from all over the country to have the surgery done because either they were concerned about their ability to maintain face down positioning, or they physically could not do so. And this has been a wonderful boon to the field. I believe that this is going to become the standard of care because removing this burden of face down positioning is a more effective way of delivering care. It's actually safer, and is much more well accepted by patients because they're more comfortable and their stress level is reduced.

We achieved a 100% closure rate using this method in a consecutive case series of 68 published patients in the October issue of *Ophthalmology* 2013. Subsequent to that, we've done dozens of additional macular hole repairs, and are well over 100 successful cases, all with no face down positioning very happy patients. I'm Dr. Raymond Iezzi from the Mayo Clinic, and I thank you for your time.