new method to calculate the area of internal limiting membrane (ILM) peeled in macular hole surgery may provide a simple and effective means of improving the closure rates of symptomatic idiopathic full thickness macular holes, according to a study presented at the 2012 EURETINA Innovation Awards.

“Our approach uses a novel standardised reproducible method to calculate the area of ILM peeled intra-operatively in macular hole surgery by using Boral’s ring, a video overlay of three equidistant concentric rings created using Adobe Photoshop,” said Subhendu Kumar Boral MD, Disha Eye Hospitals and Research Centre, Barrackpore, Kolkata, India. “The method is easily reproducible and can be applied by anyone using Adobe Photoshop. The video overlay is simple to use and can be made easily without any financial investment,” he added.

Dr Boral said that no study to date has described a standardised and reproducible method of calculating the area of ILM peeled in macular hole surgery or examined the association between the periperaoperative ILM peeled area and the postoperative pattern of macular hole closure.

He noted that the overall presence of macular holes is about 3.2 cases per 1,000 persons older than 55 years. In the Beijing Eye Study, 1.6 out of 1,000 elderly Chinese were affected, and it is believe that the prevalence is similar in Europe.

Reviewing the scientific literature, Dr Boral said that macular hole closure pattern is variable and not predictable. Hole diameter and ILM peeling were found to be the only significant factors in successful hole closure in a study by Brooks et al in 2000, while Ip et al in 2002 reported anatomical closure in 92 per cent of cases with preoperative macular hole diameter of less than 400 microns but only 56 per cent in eyes with more than 400 microns. Another study by Kumagai et al in 2004 found that ILM peeling increased the macular hole closure rate, with anatomic closure in 92 per cent of ILM peeling cases compared to 81 per cent of patients in the non-ILM peeling group.

Furthermore, a study by Kang et al to evaluate the clinical significance of macular hole closure types assessed by optical coherence tomography (OCT) distinguished two types of closure: type I, without any foveal neurosensory defect, in 61 per cent of patients, and type II, with foveal neurosensory retinal defect, in 39 per cent of patients.

As Dr Boral noted, calculating the area of ILM peeled has traditionally been measured on the basis of visual impression according to the periperaoperative size of the optic disc head, not on any scientific reproducible basis.

“The previous studies did not highlight how much area of ILM has to be peeled for better centripetal tissue mobilisation according to the preoperative macular hole diameter in order to ensure postoperative macular hole closure without any foveal neurosensory retinal defect,” he said.

To bridge the gap, Dr Boral came up with the idea of using three equidistant concentric circles as a video overlay during the surgery in order to calculate the area of ILM peeled and its relation with hole closure pattern on OCT in idiopathic full thickness macular hole cases. To test the technique, Dr Boral and co-workers carried out a prospective single-blind study of 105 eyes of symptomatic full thickness macular hole patients.

All patients remained in prone position for at least seven days after surgery, with a minimum postoperative follow-up of six months. The minimal diameter of the macular holes (MDMH) was calculated on OCT and patients were divided into two groups: 75 patients in group one with macular holes greater than 400 µm and 30 patients in group two with macular holes smaller than 400 µm.

All patients underwent 23-gauge vitrectomy, ILM peeling, and gas injection to seal the holes. The final area of ILM peeled (AIP) was calculated using Adobe Photoshop CS2 in disc diameter (DD) measurements taken from video still frames.

Looking at the results, the full thickness macular holes were closed in 97 out of the total of 105 eyes (92 per cent), with a closure rate in group one of 67 out of 75 eyes (89 per cent) and 30 out of 30 in group two (100 per cent).

Patients in group one with an ILM peel of more than 3 DD showed a statistically high incidence of type I closure (without any foveal neurosensory defect, 72 per cent) compared to type II closure (with foveal neurosensory defect, 27 per cent).

When the ILM peels were less than 3 DD in size for the same group, the type I closure was 35 per cent and type II was 65 per cent. In group two patients where the ILM peeled was greater than 3 DD again showed a significantly high incidence of type I closure (84 per cent versus 16 per cent of type II), said Dr Boral.

“We can conclude from our study that Adobe Photoshop CS2 is a useful tool to measure final area of ILM peeled in macular hole surgery. We found that type I closure was significantly higher for patients with AIP greater than 3DD in both large and small idiopathic macular holes. This method will enable the surgeon to adjust the extent of the ILM peeling during the surgery, taking account of the preoperative macular hole diameter, in order to get a better closure pattern postoperatively,” he concluded.