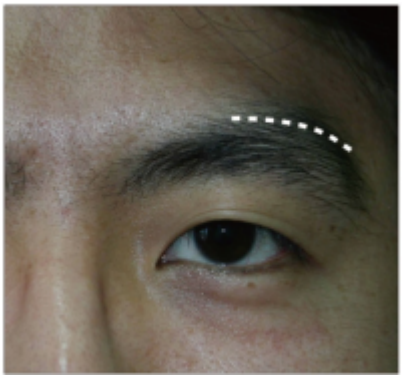
Superciliary keyhole approach



In the modern era of neurosurgery, the use of the operative microscope, rigid rod-lens endoscope, and neuronavigation has helped to overcome some of the previous limitations of surgery due to poor lighting and anatomic localization available to the surgeon. Over the last thirty years, the supraorbital craniotomy and subfrontal approach through an eyebrow skin incision have been developed and refined to play a legitimate role in the armamentarium of the modern skull base neurosurgeon. With careful patient selection, the supraorbital “keyhole” approach offers a less invasive but still efficacious approach to a number of lesions along the subfrontal corridor. In 2013 over 1000 cases have been reported in the literature utilizing this approach establishing its safety and efficacy [1].

Pain on mastication was the most commonly reported approach-related complication of the minipterional craniotomy, and occurred in 7.5% of cases. Temporary palsy of the frontal branch of the facial nerve and temporary supraorbital hypesthesia were associated with the supraorbital craniotomy (SOC) eyebrow variant, and occurred in 6.5%, respectively in 3.6% of cases. Transient postoperative periorbital edema and transient ophthalmoparesis occurred in 36.8% and 17.4% of cases, respectively, when the SOC was performed via an eyelid skin incision. The risk of occurrence of the latter 2 complications was related to the removal of the orbital rim, which is an obligatory part of the SOC approach through the eyelid but optional with the SOC eyebrow variant.

Each of the 3 keyhole approaches has a specific set and incidence of approach-related complications. It is essential to be aware of these complications to make the safest individual choice.

A superciliary approach can be a reasonable alternative to a pterional approach for small (<15 mm) UIAs arising at the supraclinoid ICA, A1, ACoA, and M1 segment including the MCA bifurcation [2].

For unruptured anterior circulation aneurysms, a superciliary keyhole approach using a supraorbital minicraniotomy, rather than a pterional approach, is invariably limited due to the small cranial opening.

Most anterior circulation aneurysms can still be clipped safely, rapidly, and less invasively using a superciliary approach based on appropriate indications and refined surgical technique [3] [4] [5] [6] [7] [8] [9] [10] [11] [12]

Patients who underwent an ipsilateral superciliary keyhole approach and a contralateral pterional approach for bilateral intracranial aneurysms during an 11-year period were contacted and asked to complete a patient satisfaction questionnaire. The questionnaire covered 5 complaint areas related to the surgical approaches: craniotomy-related pain, sensory symptoms in the head, cosmetic complaints, palpable cranial irregularities, and limited mouth opening. The patients were asked to rate the 5 complaint areas on a scale from 0 (asymptomatic or very pleasant) to 4 (severely symptomatic or very unpleasant). Finally, the patients were asked to rate the level of overall satisfaction related to each surgical procedure on a visual analog scale (VAS) from 0 (most unsatisfactory) to 100 (most satisfactory).

A total of 21 patients completed the patient satisfaction questionnaire during a follow-up clinic visit. For the superciliary procedures, no craniotomy-related pain, palpable irregularities, or limited mouth opening was reported, and only minor sensory symptoms (numbness in the forehead) and cosmetic complaints (short linear operative scar) were reported (score = 1) by 1 (4.8%) and 3 patients (14.3%), respectively. Compared with the pterional approach, the superciliary approach showed better outcomes regarding the incidence of craniotomy-related pain, cosmetic complaints, and palpable irregularities, with a significant between-approach difference ($p < 0.05$). Furthermore, the VAS score for patient satisfaction was significantly higher for the superciliary approach (mean 95.2 ± 6.0 [SD], range 80-100) than for the pterional approach (mean 71.4 ± 10.6, range 50-90). Moreover, for the pterional approach, a multiple linear regression analysis indicated that the crucial factors decreasing the level of patient satisfaction were cosmetic complaints, craniotomy-related pain, and sensory symptoms, in order of importance ($p < 0.05$).

In successful cases in which the primary surgical goal of complete aneurysm clipping without postoperative complications is achieved, a superciliary keyhole approach provides a much higher level of patient satisfaction than a pterional approach, despite a facial wound. For a pterional approach, the patient satisfaction level is affected by the cosmetic results, craniotomy-related pain, and numbness behind the hairline, in order of importance [13].

References

1)
Ormond DR, Hadjipanayis CG. The Supraorbital Keyhole Craniotomy through an Eyebrow Incision: Its Origins and Evolution. Minim Invasive Surg. 2013;2013:296469. doi: 10.1155/2013/296469. Epub 2013 Jul 10. PubMed PMID: 23936644; PubMed Central PMCID: PMC3723243.
2), 8)
Park J, Woo H, Kang DH, Sung JK, Kim Y. Superciliary keyhole approach for small unruptured aneurysms in anterior cerebral circulation. Neurosurgery. 2011 Jun;68(2 Suppl Operative):300-9; discussion 309. doi: 10.1227/NEU.0b013e3182124810. PubMed PMID: 21346651.
3)
Park J. Superciliary keyhole approach for unruptured anterior circulation aneurysms: surgical technique, indications, and contraindications. J Korean Neurosurg Soc. 2014 Nov;56(5):371-4. doi: 10.3340/jkns.2014.56.5.371. Epub 2014 Nov 30. Review. PubMed PMID: 25535512; PubMed Central PMCID: PMC4272993.
4)
Lan Q, Gong Z, Kang D, Zhang H, Qian Z, Chen J, et al. Microsurgical experience with keyhole operations on intracranial aneurysms. Surg Neurol. 2006;66(Suppl 1):S2–S9.
5)

Mitchell P, Vindlacheruvu RR, Mahmood K, Ashpole RD, Grivas A, Mendelow AD. Supraorbital eyebrow minicraniotomy for anterior circulation aneurysms. Surg Neurol. 2005;63:47–51. discussion 51.
6)

Paladino J, Mrak G, Miklić P, Jednacak H, Mihaljević D. The keyhole concept in aneurysm surgery–a comparative study : keyhole versus standard craniotomy. Minim Invasive Neurosurg. 2005;48:251–258.
7)

Park J, Kang DH, Chun BY. Superciliary keyhole surgery for unruptured posterior communicating artery aneurysms with oculomotor nerve palsy : maximizing symptomatic resolution and minimizing surgical invasiveness. J Neurosurg. 2011;115:700–706.
9)

Ramos-Zúñiga R, Velázquez H, Barajas MA, López R, Sánchez E, Trejo S. Trans-supraorbital approach to supratentorial aneurysms. Neurosurgery. 2002;51:125–130. discussion 130-131.
10)

Reisch R, Perneczky A. Ten-year experience with the supraorbital subfrontal approach through an eyebrow skin incision. Neurosurgery. 2005;57(4 Suppl):242–255. discussion 242-255.
11)

Shin D, Park J. Unruptured supraclinoid internal carotid artery aneurysm surgery : superciliary keyhole approach versus pterional appro-ach. J Korean Neurosurg Soc. 2012;52:306–311.
12)

van Lindert E, Perneczky A, Fries G, Pierangeli E. The supraorbital keyhole approach to supratentorial aneurysms : concept and technique. Surg Neurol. 1998;49:481–489. discussion 489-490.
13)

Park J, Son W, Kwak Y, Ohk B. Pterional versus superciliary keyhole approach: direct comparison of approach-related complaints and satisfaction in the same patient. J Neurosurg. 2018 Mar 2:1-7. doi: 10.3171/2017.8.JNS171167. [Epub ahead of print] PubMed PMID: 29498570.

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