

D. Pathomvanich · K. Imagawa (eds.)
Hair Restoration Surgery in Asians

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Editors

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 Springer

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Why a new book on hair restoration surgery?

The answer is simple: people of Asian physical characteristics make up approximately 60% of this planet's population. The proportion is even greater if we include some of those from Oceania and the native races of North and South America who carry a large proportion of Asian genes.

Asians are a genetically diverse group of people who may be subdivided into at least 30 distinct subgroups with varying physical characteristics and hair types. Their hair varies from the coarse, but relatively sparse, hair of the Japanese and Han Chinese to the fine, densely packed, and wavy hair seen in people from some parts of India. Baldness also varies from the minimal degrees seen in south Asia to the very severe grades commonly seen on the subcontinent. There is also considerable variation within each ethnic group, as within the Caucasian population.

The surgical transplantation of autografts of human hair was first described in detail in a series of articles by Dr. Shoji Okuda in Japan in 1939 [1]. In his articles he alluded to prior work on hair implantation and autotransplantation done by several other researchers. Okuda's technique was used for the replacement of eyebrows and pubic and axillary hair, but scalp hair was never mentioned. This omission does not mean that scalp hair transplantation was not done at all, only that it was not listed as a target site in the various published articles. The use of surgical skills for the restoration of lost scalp hair was probably regarded as a purely frivolous procedure in very conservative pre-war Japan. Mention of such "cosmetic" procedures may have been deliberately omitted or edited from the text of articles submitted for publication in the very conservative medical journals of the day [2].

With the disruption caused by the war, hair transplantation was ignored in Asia for decades and was "rediscovered" by the New York dermatologist Norman Orentreich in 1959 [3]. At the time he was investigating whether skin with certain dermatological conditions exhibited donor or recipient dominance when transplanted from one site to another. Male baldness appeared to be a condition that exhibited donor dominance [4].

Surgical hair restoration was taken up only slowly by doctors in Asia after WW II, although it was evident from the popularity of hairpieces that Asians disliked baldness as much as their Western counterparts. The implantation of artificial hair

was developed in Japan from 1964 as an alternative to hairpieces and enjoys a considerable market share in that country to the present day [5].

Rapid improvements in hair transplant technique occurred in the West from the mid-1970s onward. The motivating factor was the establishment, by the late American dermatologist D. Bluford Stough, of a series of scientific meetings to discuss hair transplantation. Almost concurrently, a textbook on the subject was published by fellow dermatologist Dr. O'Tar T. Norwood of Oklahoma City [6]. Several other textbooks by dermatologists and plastic surgeons followed in the decade ahead. A quantum leap occurred with the establishment of a bimonthly newsletter on hair transplantation by Dr. Norwood in 1990 [7]. For the rapid exchange of ideas and techniques, this medium proved far superior to the conventional surgery and dermatology journals, and even the meetings of the day, which were often restricted to members of certain specialty groups.

The next important step was the formation of a society open to all physicians interested in surgical hair replacement. This group was initiated by Dr. Dowling Stough, (son of the above-mentioned Bluford Stough) and actively supported by Dr. Norwood and many others [8].

With a bimonthly newsletter and an annual scientific meeting, hair restoration surgery was in the fast lane at last, and improvements have been numerous and impressive. As with any new field, there were many false starts and "dead-ends" over the subsequent years, but we have now achieved ways to efficiently perform the single hair procedures described as the ideal by Dr. Hajimi Tamura of Japan in 1943 [9].

With the rapidly increasing wealth and sophistication of Asian people and their willingness to embrace cosmetic surgery procedures, it is imperative that they have a book reflecting their specific requirements. Hopefully this is such a book, and I wish the editors and contributors every success with this important publication.

Richard C. Shiell, MBBS
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About the Author:

Dr. Shiell was co-author of the second edition of *Hair Transplant Surgery* along with Dr. O.T. Norwood in 1984 and has contributed chapters to many other books. He has authored many scientific papers, has been a prolific contributor to the specialty newsletter *Hair Transplant Forum*, and was its editor from 1996 to 1998.

Dr. Shiell was the Foundation President of the Australian Society of Hair Transplant Surgeons in 1984 and a Foundation Member of the International Society of Hair Restoration Surgery in 1993. In 1997, in Barcelona, he received the International Society's Golden Follicle Award for Services to the Profession and in 1999, in San Francisco, the society presented him with its highest honor, the Manfred Lucas Award.

Now retired from active practice, Dr. Shiell was a Foundation Member of the American Board of Hair Restoration Surgery, the Australian College of Cosmetic Surgery, and is a past-president of the Australasian Hair and Wool Research Society.

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4. This theory was challenged many years later by Prof. J.C. Kim of South Korea in 1994, and his work was later supported by his countryman, Dr. Sungjoo Hwang, in 2006. Both showed that the recipient site does exert some influence on long-term results. In retrospect, Dr. Okuda 60 years earlier had said, when speaking of the vigorous growth of transplanted eyebrow hairs, “later they gradually assimilate the recipient graft area morphology.”
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Preface

Hair transplantation as we know originated in Japan [1]. However, the art and science of hair transplantation have received further progression and refinement in Western countries [2]. Because the outcome of hair transplantation today is more natural, and good density can be achieved in just one or two sessions compared to the several sessions required in the past, hair transplantation is in demand worldwide. With an influx of new physicians entering this challenging field of medicine, we believe that further education and training are imperative and must be available to provide a standard of medical practice.

A recent survey conducted by the International Society for Hair Restoration Surgery (ISHRS) reported that 57 542 procedures were performed in Asian countries in 2006, a significant rise from 20 673 in the year 2005 [3]. However, the number is still very low compared with North America and Europe. We believe Asian hair is different from that of Caucasians, and not all aspects of the procedures used for Caucasians are applicable to Asian patients and their Asian hair.

There are many hair transplantation textbooks available for hair restoration surgeons; however, each text contributes only a few pages pertinent to hair restoration in Asians. So, we felt there is a need for a text exclusively devoted to Asian hair. We believe this might be the first textbook dedicated to the many aspects of hair restoration surgery in Asians.

The text carries several objectives. For beginners, it provides a simple explanation of hair restoration surgery. For experienced surgeons, it serves as a quick reference. Globalization increases the possibility that surgeons working in the West may be approached by Asians for hair transplantation. Although not an encyclopedia of hair restoration, this text still provides a quick and complete reference on Asian hair and the differences in the patients' demands. We try to provide practical tips. Chapters on regional transplantation such as eyebrows, eyelashes, sideburns, beards, and mustaches are incorporated in addition to the usual scalp hair restoration. We tried our best to organize this book with a limited number of pages and illustrations but still give all readers complete knowledge of Asian hair restoration surgery.

The editors initially considered the compilation of the experience of all hair transplant surgeons working in Asia. This, however, is a difficult task to initiate. During the Regional ISHRS Live Surgery Workshop in Yokohama, Japan, the

authors met and all agreed to limit the number of contributors. We were fortunate that all the authors we approached agreed to write on their specialized fields, sharing experience from their decades of practice.

Every valuable contribution to hair restoration surgery is ultimately a contribution to restoration of confidence for the patient. This compilation is an attempt to pursue the same noble goal.

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Words of acknowledgment are far from sufficient to express my gratitude to every one of my colleagues for their invaluable efforts to bring about this text. The deepest of my gratitude however is reserved for Dr. Richard C. Shiell, who readily accepted my request for the laborious task of editing the text. He has been the strongest support in bringing the team from different directions to work together. His advice was valuable to all the authors, and his patience and friendliness made me feel at ease and without stress.

My parents and my family have been with me through every endeavor. The very thought of writing a book was given unabated support, as ever. This task would not have been possible without their help.

To obtain an ideal publisher was not an easy task because there are a limited number of physicians worldwide who are doing hair restoration surgery compared with other fields of medicine. I would like to express my sincere thanks to our publisher, Springer, and to Mrs. Kambara for making the impossible mission possible.

Last, but not least, I thank Drs. Richard Shiell, Jerry Wong, Jung-Chul Kim, Kitano Ohmori, Sungjoo Tommy Hwang, Kristine S. Bunagan, Bertram Ng, Konqiat Laorwong, Radha R. Palakurthi, Ms. Patcharee, and Ms. Saranya for their contributions to the chapters.

This book might have been delayed as much as a year without the help of Bertram Ng, a rising star in our field of hair restoration surgery. His valuable time was well spent in double-checking the grammar and organizing the chapters before sending them to Dr. Richard Shiell for further editing. His participation in bringing out this contemporary is deeply appreciated.

Damkerng Pathomvanich, MD, FACS

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Part I
History and the Past

Back to the Future: A Brief but Significant History of Hair Transplantation in Asians

K. Imagawa

Orentreich has been honored as the father of hair transplantation. However, one should realize that some Japanese pioneers had done great work in hair transplantation even before the release of Orentreich's papers in 1959 [1].

Shoji Okuda (1886–1962) is the best known among these pioneers. He published five series of articles titled “Clinical and experimental study of living hair transplantation” in the *Japanese Journal of Dermatology* in 1939, reporting 200 cases of reconstruction in cicatricial and congenital alopecia of the scalp as well as pubic atrichia [2]. His techniques employed specifically designed “round saws” 1.0–5.0 mm in diameter that closely resembled Orentreich's finger-operated round punches. In the Okuda papers we can find almost everything relevant to modern hair transplantation, including the principle of “donor dominance” and the miserable results of hetero-transplantation of human hair. Unfortunately, Okuda did not mention male pattern hair loss (MPHL) as a treatable condition, and thus Dr. Orentreich is honored as the first to use these innovative techniques for MPHL.

Because of the chaos of World War II, his papers drew little attention for some time. Nevertheless, his techniques have been spotlighted again and termed the “Okuda/Orentreich technique” by a German doctor, H.C. Friedrich, who discovered Okuda's work and thesis in his German-translated abstracts [3]. Because the Okuda papers were written in old *kanji* (old pictographs) and the writing was often unintelligible, even Japanese found it difficult to understand his writings until the complete English version translated by Yoshihiro Imagawa appeared in 2003 [4].

Mysteriously, no information about Okuda himself could be obtained until Inui and Itami made a thorough search in 2008. They discovered Okuda's curriculum vitae and license number on the list of medical licenses in 1930 and succeeded in tracing his family. According to an interview with his grandson, Dr. Takaaki Okuda, Shoji Okuda was born in 1886 in Nara and passed the Medical Practitioners Qualifying Examination in 1912 through self-education and training at Mitsui Charity Hospital and Juntendo Hospital. He started his practice as a general practitioner but later specialized in ophthalmology. He received his doctorate from Osaka University in 1941, worked from home for a long time, and passed away at the age of 77 [5] (Fig. 1). He would not have heard of the developments in the science of hair transplantation in the United States and elsewhere.

Fig. 1. Dr. Shoji Okuda (photograph courtesy of Dr. Takaaki Okuda)



Fig. 2. Dr. Masao Sasakawa (from *Kyudeikai-Kaishi* 1928, volume 32)



In 1929, Masao Sasakawa (1887–1932), while he was Professor of Dermatology at Keio University, reported the results of a 10-month follow-up of cases in which doubled-up human hairs were inserted in the subcutaneous tissue of cicatricial alopecia and alopecia totalis using a special needle [6]. Shiell pointed out that this was a very insightful approach as artificial hair implantation using synthetic hair was very popular in Japan from the late 1970s until the present time [7] (Fig. 2).

Hajime Tamura (1897–1977) performed many hair transplant procedures when he was Professor of Urology at Tokyo Women's Medical University. It was reported that 127 cases in 1937 failed but that 136 cases after 1939 showed good results [8]. His techniques using single-hair grafts produced an excellent natural appearance. However, he seems to have lost interest in hair restoration after he became Professor of Urology at Keio University in 1944 (Fig. 3). Had doctors in Western countries become aware of his achievements earlier and adopted his techniques, the history of hair transplantation would have taken a different course and punch grafting may not have become the standard procedure for more than 30 years.

Fig. 3. Dr. Hajime Tamura (from Issui Nikki, 1978)



Fig. 4. Dr. Keiichi Fujita (from *Journal of Japan Society of Aesthetic Surgery* 1985, volume 24-1)



Keiichi Fujita graduated from Tokyo University in 1947. While he worked for Tama Zensei Yen in the Institute of Hansen Disease, he performed many eyebrow reconstructions using single-hair grafts. Fujita reported that scalp hair transplanted as eyebrows grew long but behaved more like eyebrow hair after 1 year. This phenomenon was later known as “recipient influence” [9]. Also, he reported that donor hairs would grow even when kept in refrigeration for 4 days [10]. No further reports were released in regard to hair restoration after he was appointed Professor at the Japanese Army Medical Hospital and Medical University in 1957. I wonder whether he might have grown tired of the long hours of tedious work (Fig. 4). Late in the lives of Tamura and Fujita, the Okuda/Orentreich techniques had gained popularity in Western countries. I wonder whether they knew and, if so, how they felt about it.

After that there were no more reports of surgeons using single-hair grafts in Asian countries until Choi and Kim reported their attempts at using small grafts in 1992 [11,12]. Mr. Paek was using single hairs to restore leprosy-affected patients well before this time, however, and he was presented with an award by the

International Society of Hair Restoration Surgery (ISHRS) at their annual meeting in Hawaii 2000 for his long-unreported contribution to our field [13]. Western surgeons such as Uebel, Unger, and Shiell were also using single hairs cut from the sides of plugs to soften the front edge. These cases were mentioned at meetings but were not published in the literature until Emmanuel Marritt's paper in the very early 1980s [14] and the textbook by Norwood and Shiell in 1984 [15].

Two Techniques of Hair Transplantation in Asia

Until the end of the 1980s, macrografts had been overwhelmingly made of artificial fibers because of the aggressive marketing of the latter as “natural-looking implants.” When the author first started hair practice in the late 1980s, many colleagues mistook hair transplantation as artificial fiber implantation.

The widespread acceptance of hair transplantation in Asia owed a great deal to Drs. Choi and Kim, who invented an epoch-making planter. Initially, they used only single-hair grafts and later two- and three- “bundle hair” grafts, which are synonymous with the more standardized term “follicular units” (FUs). Follicular unit transplantation (FUT) and the use of Choi or KNU planters have characterized the two standard techniques used in Korea and Japan up to the present time. Very few Asian doctors adopted Western techniques of hair restoration until the early 1990s.

Other Techniques of Hair Restoration in Asia

Alopecia reduction has never been popular because the Asian scalp is comparatively tight. The maximum amount of bald skin that can be removed is less, and the pain increases dramatically with each additional millimeter (mm) past the optimum level of laxity when Asian surgeons try to remove the same width of scalp as described in the Western literature. Also, the scar in the thinning area becomes wider and more noticeable and there are many other potential complications, such as stretch-back, stretch-atrophy, and slots. Although a few doctors still offer this procedure, the numbers have markedly declined.

In contrast, scalp flaps were very popular in Japan. Many Japanese plastic surgeons were convinced that scalp flaps work better than grafts for the black, coarse, and straight Asian hair. This method is, however, not without its complications as the high incidence of smoking in Asians and their tight scalps would increase the potential risks of telogen effluvium, flap necrosis, and hair loss in the area from where the flap was taken. With the rapid progression of FU transplantation, however, the use of flaps in both MPHL and female pattern hair loss (FPHL) has decreased (see the chapter “Is There a Place for the Scalp Flap in Modern Hair Restoration Surgery?” in this volume).

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Part II

Asian Hair: Knowing the Differences

The Prevalence of Male Pattern Baldness in Asian Men

R. Palakurthi

The prevalence of male pattern baldness (MPB) in Caucasians is well documented by Norwood [1] and Hamilton [2]. Takashima, Iju, and Sudo [3] and Kakizo [4] studied MPB in Japanese and found that it was minimal before the age of 40 and, although incidence increased with age, it was lower than in Caucasians.

In Singapore, P.H. Tang et al. [5] reported a prevalence of 63% in Norwood type I to VII. The prevalence increased with age from 32% among young adults aged between 17 and 26 years to almost 100% for those in their eighties.

In Bangkok, Thailand, D. Pathomvanich conducted a randomized study in 1997 including 1124 Asian men (local Thai and Chinese) between the ages of 18 and 90 [6]. The prevalence of baldness was reported as 38.52%; this alarmingly high figure approached that of Caucasians, rather than the one-fourth to one-third reported in previous studies [3]. Also as seen in Caucasians, the prevalence increased with age, affecting 11% young adults aged over 20 years and reaching 61.78% at 70 years of age. The results compared to the Norwood and Hamilton groups are summarized in Figs. 1 and 2. There were, however, two limitations in this survey. First, the small number of men over 80 years (31 men) might have biased results when compared to the Norwood study in the same age group. Also, there were two Asian subgroups involved in this study, Thai and Chinese.

In China, a population-based cross-sectional study of 3519 Chinese men in July 2008 reported a prevalence of 19.9% of MPB [7]. The prevalence increased with advancing age: 0.3% in the first and second decade, 0.4% in the third decade, 2.7% in the fourth decade, 10.1% in the fifth decade, 20.5% in the sixth decade, 43.5% in the seventh decade, and 60.0% over 70 years of age.

In Korea, J.-H. Paik et al. reported the prevalence of MPB in Korean men of all age groups as 14.1% [8]. The prevalence increased steadily with advancing age, but was lower than that in Caucasians: 2.3% in the third decade, 4.0% in the fourth decade, 10.8% in the fifth decade, 24.5% in the sixth decade, 34.3% in the seventh decade, and 46.9% over 70 years.

From these figures, the prevalence of MPB in Chinese and Korean men was similar to but significantly lower than the prevalence in Thailand. The highest

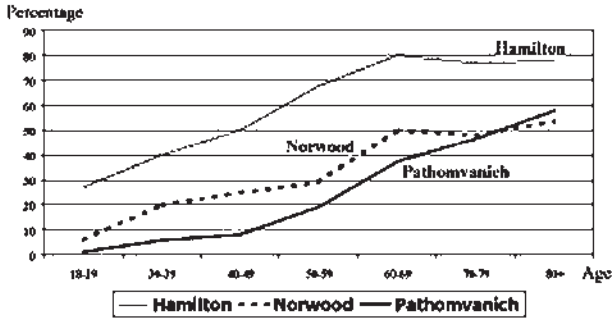


Fig. 1. Comparison of class IV–VII between the Hamilton, Norwood, and Pathomvanich studies. Asians in the Pathomvanich study and Caucasians in the Norwood/Hamilton studies both demonstrated increased prevalence with age. The prevalence of class IV–VII in Asians was lower until after age 80, when it was higher than the Norwood although still lower than the Hamilton groups

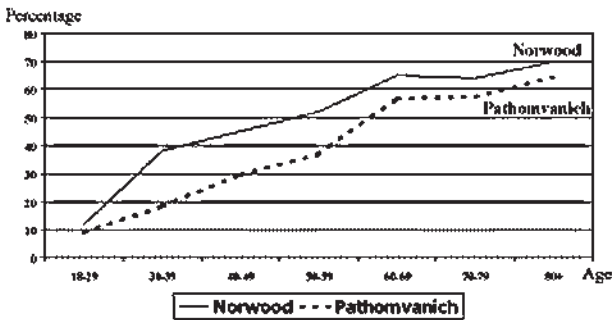


Fig. 2. Comparison of class III–VII between the Norwood study and Pathomvanich study. In comparison to Norwood, the prevalence of III–VII was overall lower in all age groups

prevalence among the Asian groups studied was the 63% in Singapore; this may be attributed to the different nationalities residing in the country or the inclusion of the almost normal Norwood class I in the Singapore study.

In summary, there is a similar increase of prevalence with age among all the Asian groups studied. The majority of Asian MPB also fits into the Norwood classification. The reason for an increase in the prevalence of MPB when compared to Caucasians remains unknown, but change toward a Western diet and lifestyle may play a role. More studies from other Asian countries, such as the Indian subcontinent, Pakistan, and Japan should throw light on the actual occurrence. The wide variation in prevalence rates in the current Asian studies would require a more standardized protocol.

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Knowing the Difference in Restoring the Asian Look

K. Imagawa

Shoguns, the leaders of the samurai, governed Japan until the overthrow of the Tokugawa Shogunate in 1867. During their ruling periods, hairstyling was used to indicate the social rank and class of Japanese men. There was no obvious male pattern baldness at that time because every man appeared bald as a result of a custom called *sakayaki*. During the coming-of-age ceremony, the potential bald area would be shaved (Fig. 1), and this hairstyle maintained throughout life.

Although it is said that *sakayaki* would help to prevent the buildup of dampness on the head while wearing a military helmet, this style was also popular in classes other than the warrior class. Just like people of our generation, ancient Japanese men might have felt uneasy about becoming bald and found a clever way to conceal the problem. It would therefore be fair to say that baldness was used to imply a positive image of wealth and virtue in Japan. The “pigtail” hairstyle found in the Qing dynasty of China also served to conceal crown baldness. These customs suggest that the onset of pattern baldness was probably unpopular with males throughout the Orient.

Until recently, most believed that the occurrence of male pattern hair loss (MPHL) in Asian people was less than that in Caucasians. Takashima et al. reported that the incidence of MPHL in Japanese is only a quarter of that in Caucasians [1]. Adachi reported 10 years ago that 9.7 million Japanese men experienced MPHL, with a prevalence of 21%. This figure was lower than that in Caucasians (i.e., USA, 34%; England, 36%; Germany, 41%) [2]. According to Inaba, who was well known as an advocate of the sebaceous gland hypothesis, the prevalence of MPHL increased in the Japanese community, probably as a result of the shift to a more Westernized diet. However, no supporting evidence has been provided to substantiate this claim [3]. Pathomvanich conducted a thorough investigation of Thai men and concluded that MPHL in Asians was not as low as previously believed [4] (see the chapter by Pathomvanich in this volume).

It is important to understand the ethnic differences between the scalp and hair of Asians and Caucasians when performing hair transplantation.

Fig. 1. An Edo period woodblock print: Kabuki actor by Syaraku (1794). The frontal and parietal area is shaved: this is called *sakayaki*



Fig. 2. Comparative anatomy of typical Asian and Caucasian skulls (top view)

Skull and Facial Bone

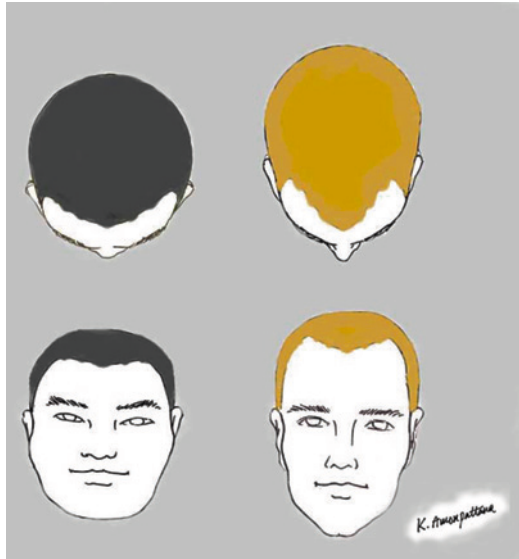
A typical skull in Asians is short in length but wide in transverse measure. Frontal and occipital projections are less prominent. These characteristics give the Asian skull a round appearance when compared to the more oblong shape of the typical Caucasian skull (Fig. 2).

Although no specific data are available, many hair surgeons would still agree that the average head size of Asian is larger than that of Caucasians [5].

Hairline

The hairline in Asians is different from that of Caucasians because of varied anatomical features, and the following should be considered when creating a natural-looking hairline.

Fig. 3. Difference in hairlines comparing Asians and Caucasians. The typical Asian hairline is flatter than that of a typical Caucasian



1. Basic facial shape: triangular, square, oval, round, and pear shaped
2. Slope of forehead: flat, sloped, curvilinear, and cliff like
3. Frontotemporal angle: wide, acute, and round. The majority of Asians have a wide frontotemporal angle rather than the acute angle seen in Caucasians.
4. Position of hairline: Asian hairlines are, on average, located a little lower than that of Caucasians. The “four fingers rule” in positioning the anteriormost points 8 to 10 cm above the glabella is seldom accepted. As a result, more hair is required in creating the Asian look.
5. Basic shapes of hairline:
 Frontal hairline: straight, U-shape, inverted U-shape, V-shape, and quadrangular.
 Temporal hairline: according to Mayer’s classification [6].

The Asian face looks flat because of the round skull, shallow eye sockets, and button nose. These features create a flatter hairline when compared to the bell shape seen in Caucasians (Fig. 3).

Many different shapes of hairline are found in Asia, but the favorite in Japan is the one with a widow’s peak called *fujibitai*, referring to the peak of Mt. Fuji [7].

Scalp

According to an old study, Japanese have a thicker scalp than Finnish persons [8]. The overall tough and tight scalp of Asians makes it difficult to apply the blunt dissection technique in donor harvesting. I have given up the use of Haber’s scalp