2 Hair Shafts

Lidia Rudnicka, Adriana Rakowska, Malgorzata Olszewska, Monika Slowinska, Joanna Czuwara, Magdalena Rusek, and Ana Maria Costa Pinheiro

Abstract

Normal hair shafts are uniform in thickness and color. Trichoscopy allows detection of several hair shaft abnormalities, including various types of fractured hairs, hairs with narrowings, hairs with node-like structures, twisted or curled hairs, hairs with bands, and short hairs. In this chapter, we propose a classification of hair shaft abnormalities that may be detected by trichoscopy.

Keywords

Block hairs • Broom hairs • Coiled hairs • Comma hairs • Corkscrew hairs • Exclamation mark hairs • Flame hairs • Hair casts • Hair shafts • i-Hairs • Medulla • Monilethrix • Morse code–like hairs • Pigtail hairs • Pili annulati • Pili torti • Regrowing hairs • Tapered hairs Trichoptilosis • Trichoschisis • Trichorrhexis invaginata • Trichorrhexis nodosa • Tulip hairs Vellus hairs • Woolly hairs • Z-hairs • Zigzag hairs

Most hairs viewed on trichoscopy are normal terminal hairs that are more than 55 μm wide and are uniform in thickness and color [1, 2]. Hair shaft thickness may be roughly estimated with a handheld dermoscope (thin, normal, thick). Many videodermoscopes include software allowing a detailed assessment of hair shaft thickness in micrometers. Although precise measurement of hair shaft thickness is not essential for diagnosis, it may be useful for monitoring treatment efficacy and in clinical trials. In normal hair shafts, trichoscopy allows visualization of the medulla, which is classified as continuous, interrupted, fragmented, or absent [3]. The trichoscopic impression of the "fragmented" medulla is in fact a thick medulla separated by a thin medulla, which is not visible on trichoscopy. The thickness or presence of a medulla is believed to have no influence on hair shaft properties [3]. Up to about 10 % of normal human scalp hairs are vellus hairs, defined as hypopigmented, nonmedullated hairs less than 30 μm thick and less than 2–3 mm long [1, 2]. An increased proportion of vellus hairs is characteristic of male and female androgenetic alopecia, in which vellus hairs replace terminal ones during the process of hair follicle miniaturization [4, 5]. A high percentage of vellus and intermediate hairs contributes to increased hair shaft thickness heterogeneity, a hallmark of androgenetic alopecia [4, 6]. Vellus hairs must be differentiated from new, regrowing hairs, which are short and thin but differ from vellus hairs by not being hypopigmented and by their firm appearance and pointed end.

Various hair shaft structure abnormalities may be evaluated by trichoscopy. Exclamation mark hairs are characteristic of

L. Rudnicka (✉)
Faculty of Health Sciences, Medical University of Warsaw, Poland

Department of Dermatology, CSK MSW,
Woloska 137, Warsaw 02-502, Poland
e-mail: lidia.rudnicka@euderm.eu

A. Rakowska • M. Slowinska • J. Czuwara • M. Rusek
Department of Dermatology, CSK MSW, Warsaw, Poland

M. Olszewska
Department of Dermatology, Medical University of Warsaw, Warsaw, Poland

A.M.C. Pinheiro
Department of Internal Medicine, Hospital Universitario de Brasilia, Brasilia, Brazil

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(but not specific for) alopecia areata. Trichoscopy allows visualization of exclamation mark hairs that are 1–2 mm long. Thus, some authors refer to these structures as "micro–exclamation mark" hairs [7]. On the other end of the spectrum are very long exclamation mark hairs emerging from follicles that are only partially struck by alopecia areata, becoming thinner as they grow. Terms used to describe such hairs are *tapered hairs* and *coudability hairs*, from the French word *coude* [8, 9].

Slowinska et al. [10] described comma hairs (short bent hairs) as a specific feature of tinea capitis. In later studies, corkscrew hairs [11, 12] and zigzag hairs, or Z-hairs [13], were identified as other characteristic features of tinea capitis.

Most genetic hair shaft dystrophies, such as monilethrix, trichorrhexis invaginata, trichorrhexis nodosa, pili torti, and pili annulati [14], may be diagnosed by trichoscopy [15].

Another feature that may be evaluated by trichoscopy is the number of hairs in one follicular unit; usually one to three hairs emerge from one follicular opening [1, 16]. The percentage of follicular units with only one emerging hair shaft is less than 30 % in healthy individuals and may be decreased in various types of hair loss, especially telogen effluvium and androgenetic alopecia.

In this chapter, we propose a classification of hair shaft abnormalities that may be detected by trichoscopy. This classification partly corresponds to comparable observations on light microscopy [14, 17, 18].

Table 2.1 Classification of hair shaft abnormalities in trichoscopy

1. **Fractured hairs**
Trichoptilosis
Trichoschisis/trichoclasis
Irregular fractures caused by mechanical force
Golf tee hairs (trichorrhexis invaginata)
2. **Narrowings**
Monilethrix
Monilethrix-like congenital hypotrichosis
Monilethrix-like hairs (Pohl-Pinkus constriction)
Pseudomonilethrix
Tapered hairs
Exclamation mark hairs
3. **Node-like appearance**
Trichonodosis
Trichorrhexis nodosa
Bamboo hairs (trichorrhexis invaginata)
Hair casts
4. **Curls and twists**
Pigtail hairs (circular or oval)
Coiled hairs
Comma hairs
Corkscrew hairs
Z-hairs (zigzag hairs)
Pili torti
Woolly hairs
5. **Bands**
Interrupted medulla
Continuous medulla
Pili annulati
Interrupted (Morse code–like) hairs
6. Short hairs
Upright regrowing
Vellus hairs
Dark lines
Tulip hairs
Block hairs
i-Hairs
Broom hairs
Broom fibers
Flame hairs

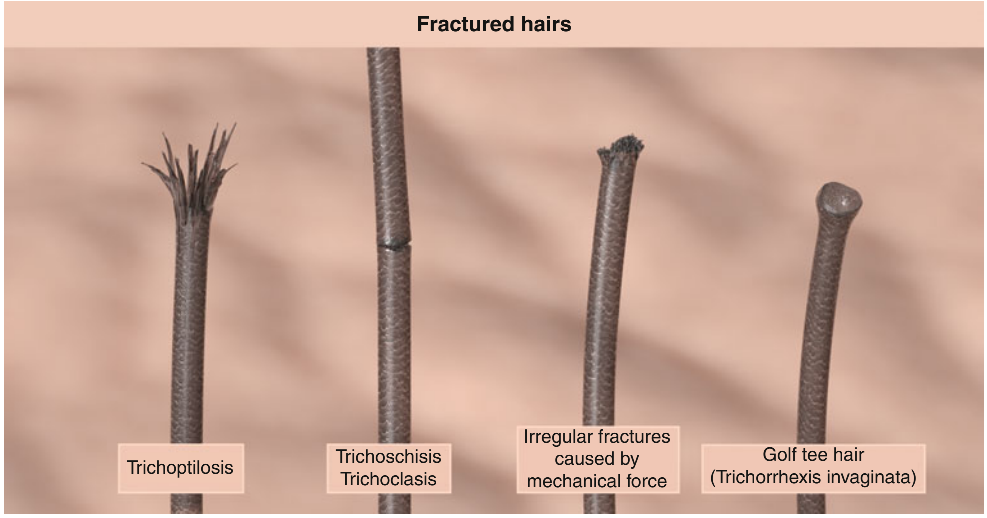

Fig. 2.1 Hair shaft fractures observed on trichoscopy (*Graphic by* Dr. Wawrzyniec Podrzucki, *Journal of Dermatological Case Reports* [JDCR])

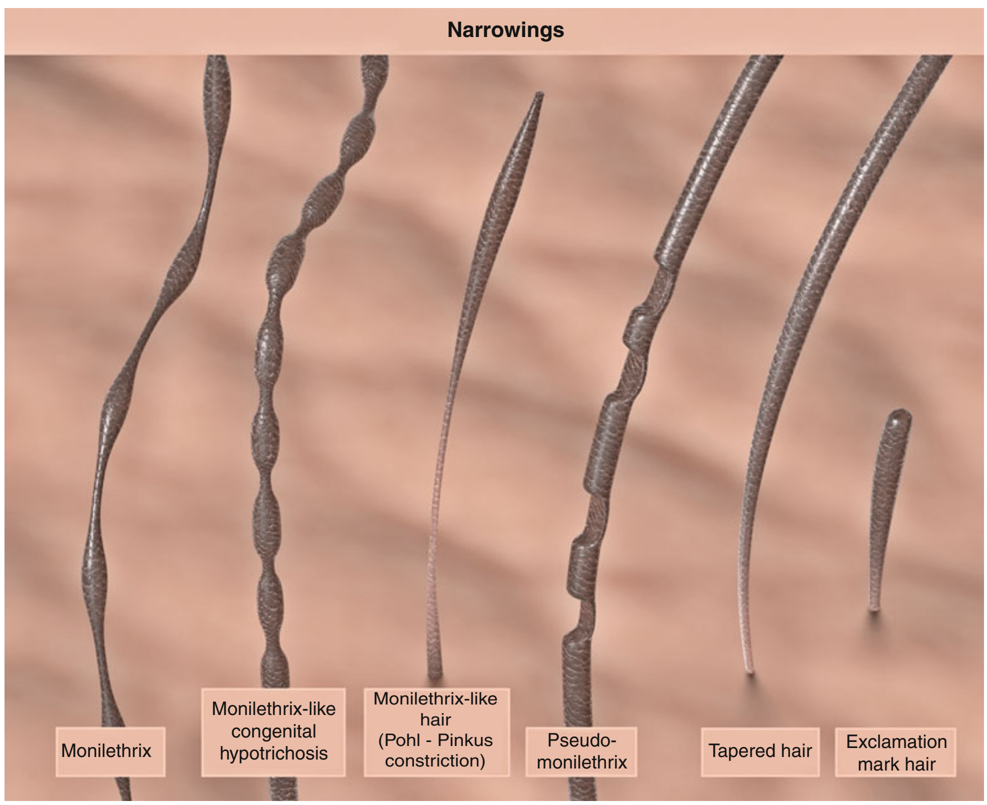

Fig. 2.2 Hair shaft narrowings observed on trichoscopy (*Graphic by* Dr. Wawrzyniec Podrzucki, *courtesy of* JDCR)

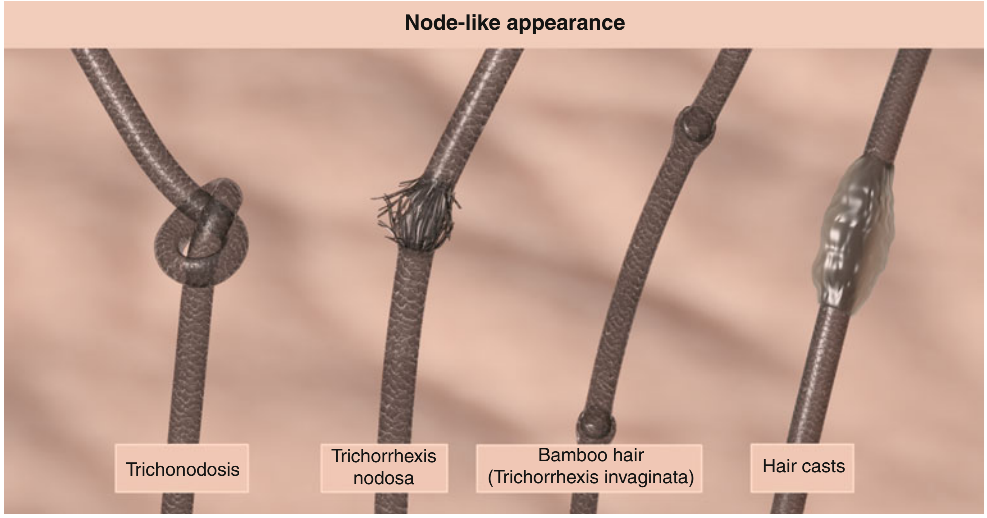

Fig. 2.3 Hair shafts with a node-like appearance on trichoscopy (*Graphic by* Dr. Wawrzyniec Podrzucki, *courtesy of* JDCR)

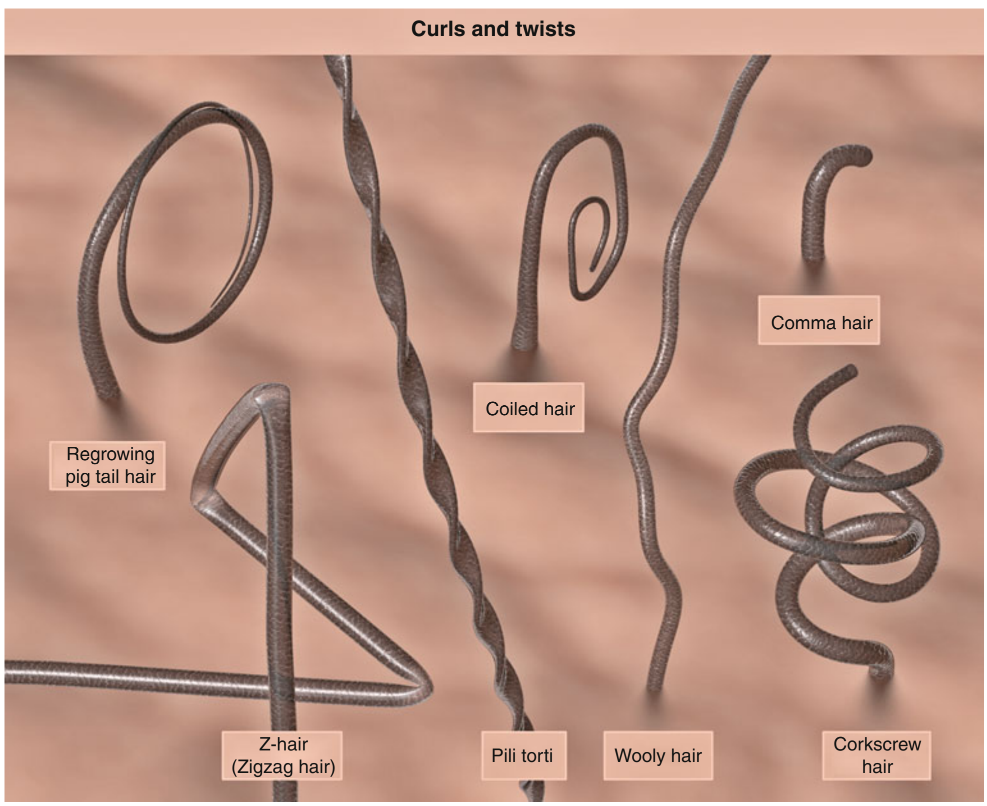

Fig. 2.4 Twisted and curled hair shafts observed on trichoscopy (*Graphic by* Dr. Wawrzyniec Podrzucki, *courtesy of* JDCR)

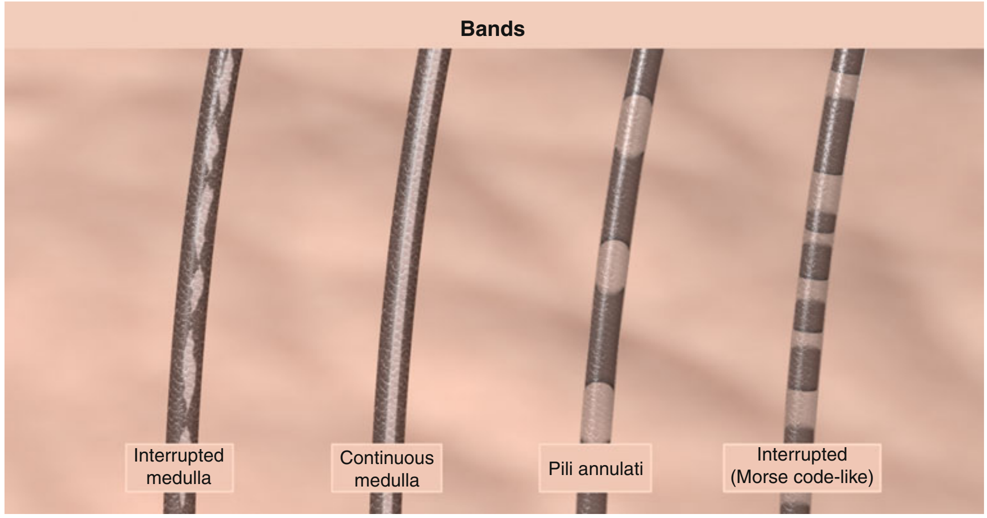

Fig. 2.5 Hair shafts with bands on trichoscopy (*Graphic by* Dr. Wawrzyniec Podrzucki, *courtesy of* JDCR)

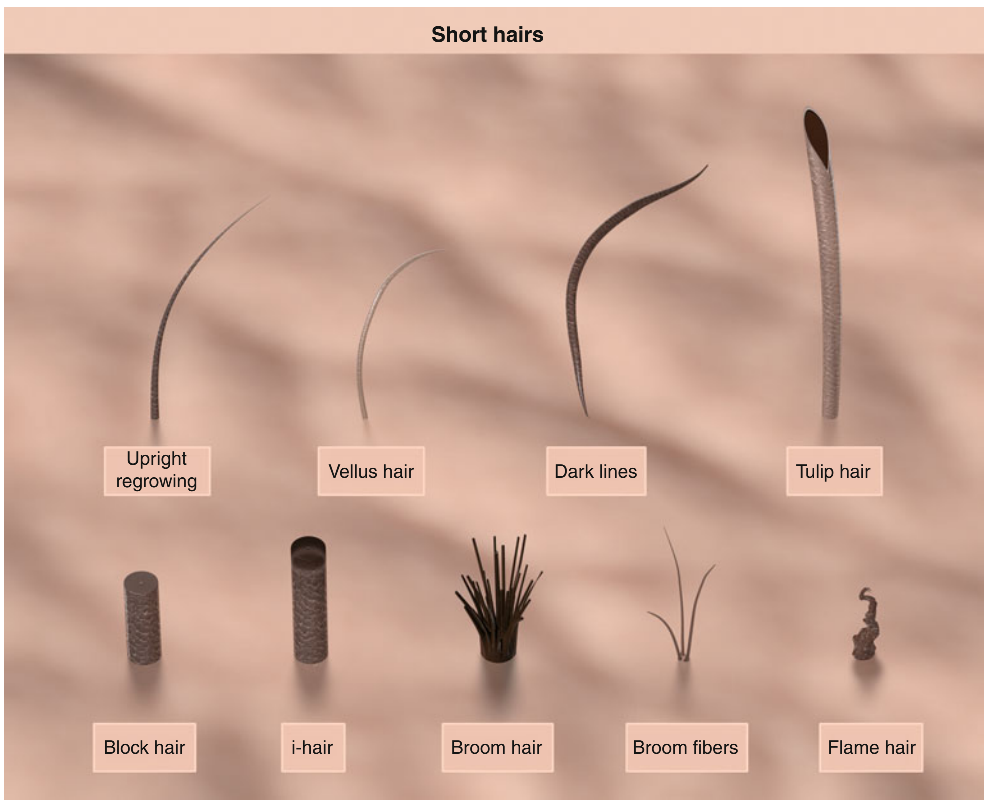

Fig. 2.6 Short hair shafts on trichoscopy (*Graphic by* Dr. Wawrzyniec Podrzucki, *courtesy of* JDCR)

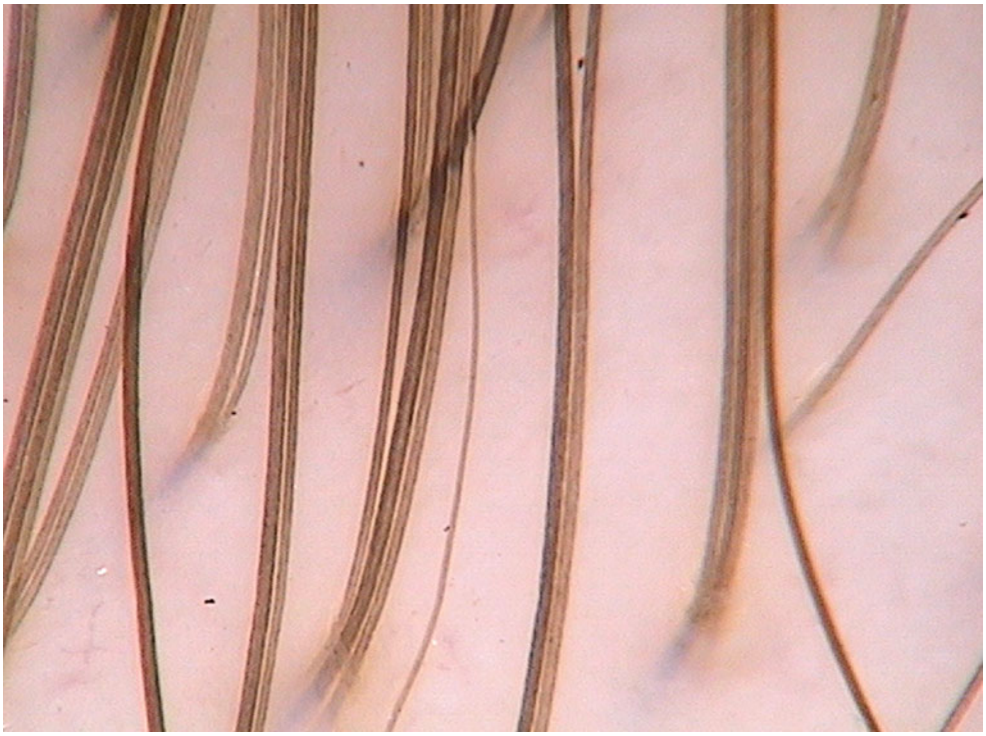

Fig. 2.7 **Normal terminal hairs**. In a healthy person, a hair shaft is uniform in thickness and color throughout its length. Normal hairs are more than 55 μm thick [1], but there may be variability in thickness among different populations as well as in an individual person (*see also* Fig. 2.9). The concomitant presence of hair shafts that differ from one another in color is a normal finding in graying persons. In children and young adults, the simultaneous presence of dark and gray hairs is rare and may be indicative of vitiligo, ectodermal syndrome, or premature graying of different causes [19]. Dark hair shafts usually are visualized better on trichoscopy compared with light blond and gray hairs. Using dry trichoscopy or videodermoscopy with higher magnification may enhance the visibility of light-colored hairs. Shown here is a normal trichoscopic image from a Central European female with dark blond hair (×70)

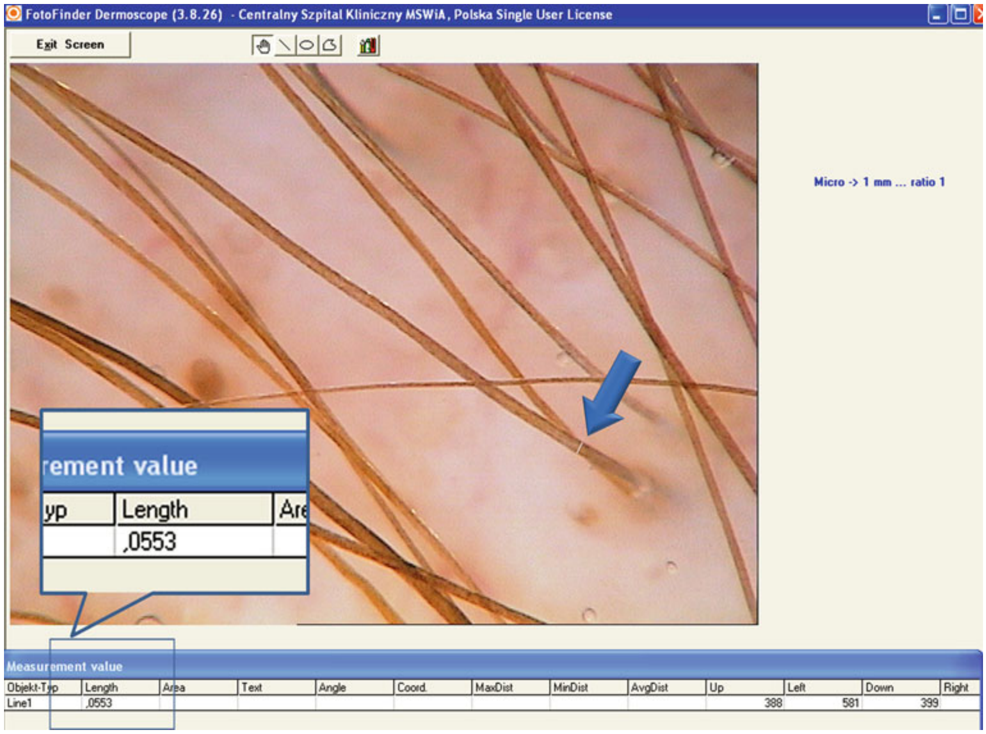

Fig. 2.8 **Measuring hair shaft thickness**. Hair shaft thickness may be roughly estimated with a handheld dermoscope based on the examiner's experience (thin, intermediate, or thick). Some videodermoscopes have software that allows precise assessment of hair shaft thickness in micrometers. Shown here is a screen shot from an evaluation of hair shaft thickness with FotoFinder Dermoscope II, model 2008 (FotoFinder Systems GmbH, Bad Birnbach, Germany). The *arrow* points to a hair shaft whose thickness was measured (*white line*). This hair shaft is 55.3 µm thick (*box*). In clinical practice, we evaluate hair shaft thickness mainly for the purpose of monitoring treatment efficacy in androgenetic alopecia. It is also a useful tool for research and clinical trials. According to the method by Rakowska et al. [1], we assess the average thickness of about 20 hair shafts in the frontal area, 20 in the parietal area, and 20 in the occipital area. The 2011 FotoFinder Dermoscope model does not have this option

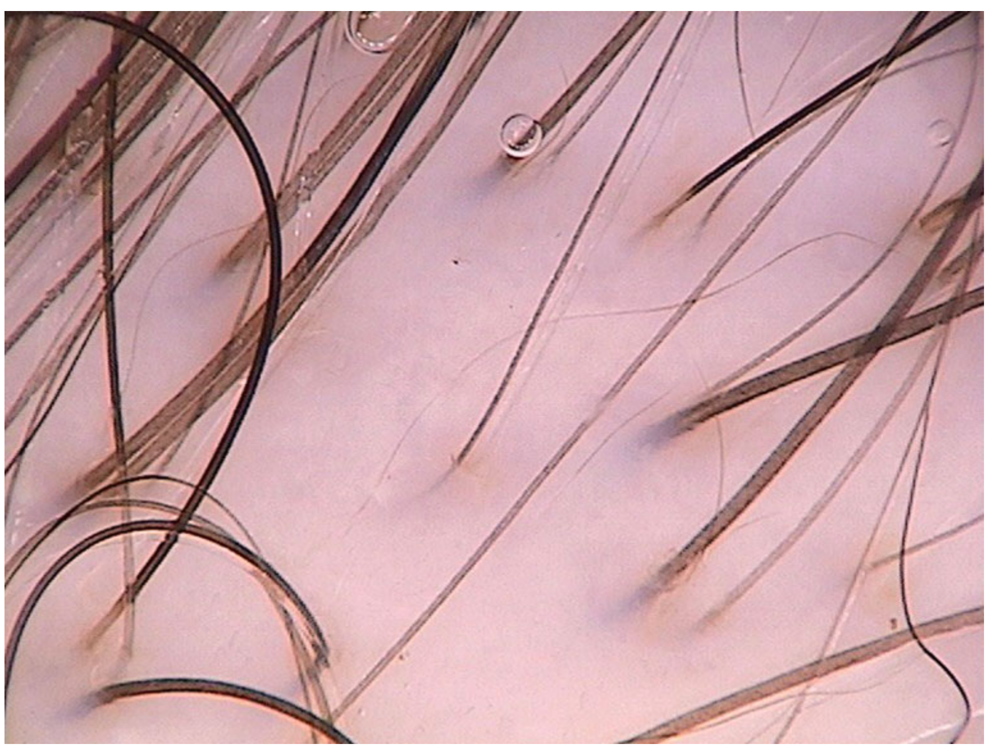

Fig. 2.9 **Heterogeneity in hair shaft thickness in female androgenetic alopecia**. The concomitant presence of thick, intermediate, thin, and vellus hairs results from unsynchronized miniaturization of hair follicles and is a hallmark of androgenetic alopecia. This feature is the same in male and female androgenetic alopecia. An increased percentage of thin and vellus hairs in areas that are otherwise normal may indicate a subclinical stage of androgenetic alopecia (×70)

Fig. 2.10 Trichoptilosis in alopecia areata. The term *trichoptilosis* refers to the longitudinal splitting of the distal end of the hair shaft. This feature can be assessed easily by trichoscopy but is not pathognomic for any alopecia type. It may be observed in healthy individuals (×70)

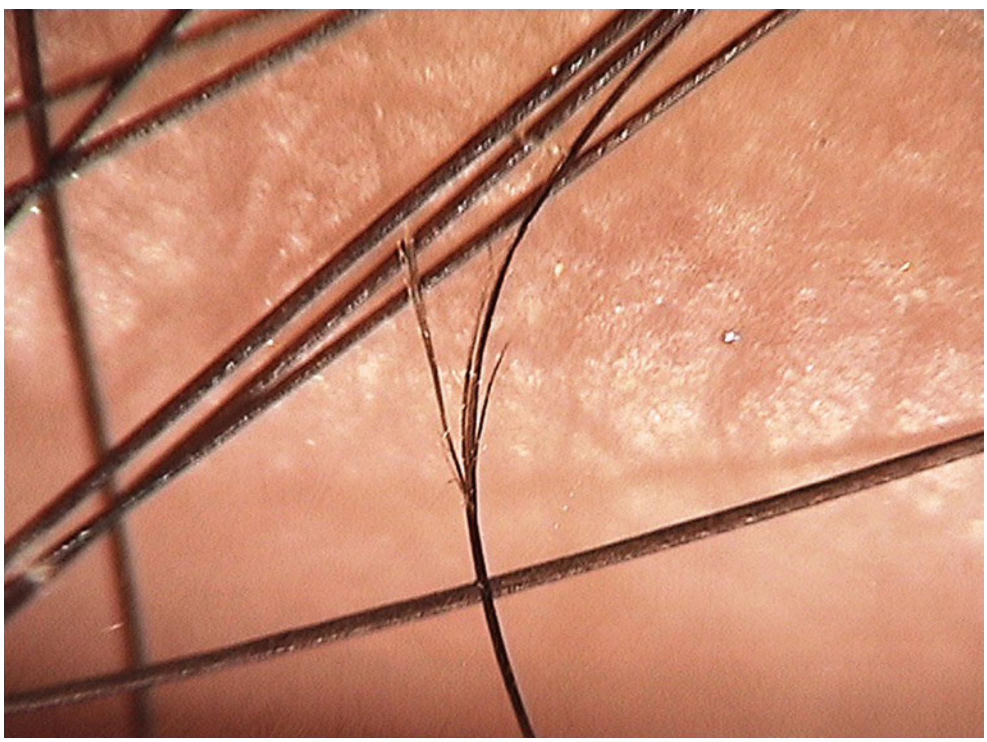

Fig. 2.11 Trichoptilosis caused by a hairstyling procedure. This image shows a long longitudinal break caused by a hairstyling procedure. Trichoptilosis is a symptom of hair shaft damage ("hair weathering") that may be caused by hair-damaging environmental factors and cosmetic procedures (×70)

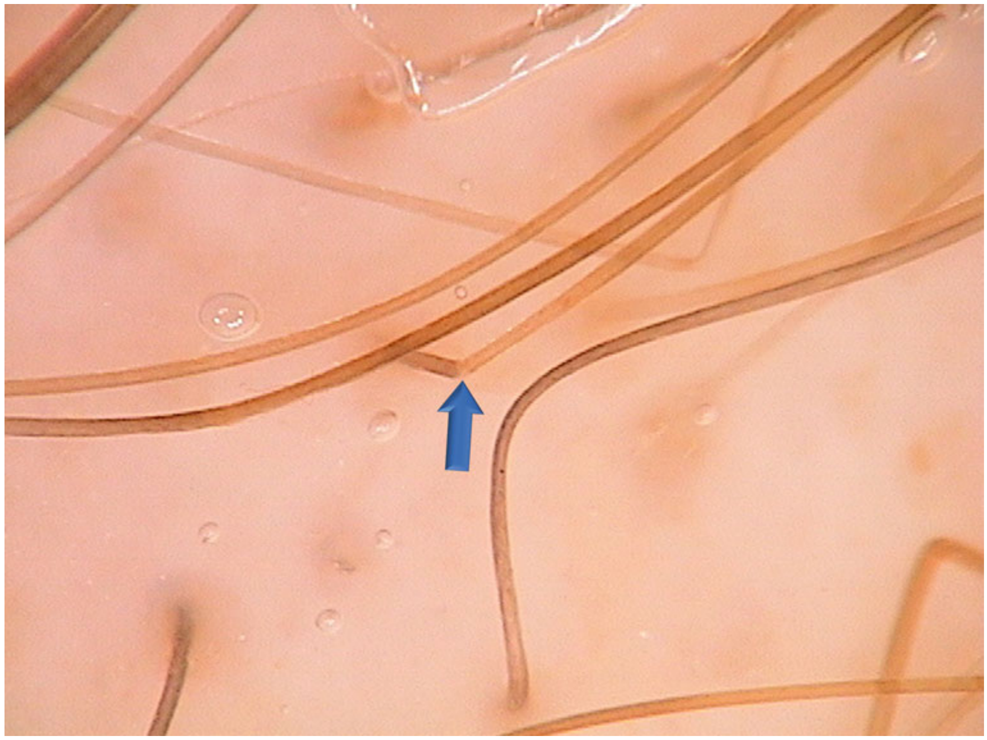

Fig. 2.12 Trichoclasis in alopecia areata. Trichoclasis is a clean transverse fracture across the hair shaft (*arrow*). It may develop secondary to conditions that weaken the hair. Idiopathic trichoschisis also has been described. This image shows a hair shaft with a clean transverse fracture, bound only by an intact cuticle. Some authors use the terms *trichoschisis* and *trichoclasia* interchangeably; others indicate that in trichoschisis there is a localized absence of the cuticle at the fracture site, whereas in trichoclasia the cuticle is intact (×70)

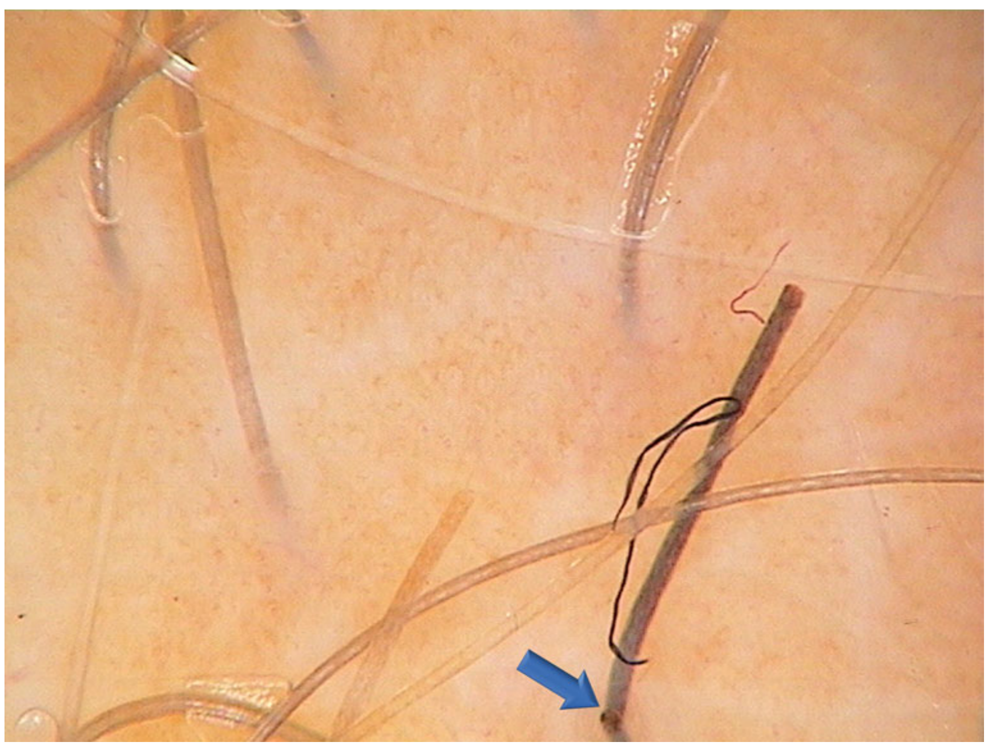

Fig. 2.13 Trichoschisis in trichothiodystrophy. The clean transverse fracture across the hair shaft (*arrow*) results from absence of the hair shaft cuticle in the affected area. Trichoschisis is a common finding in trichothiodystrophy. Trichothiodystrophy is a rare autosomal recessive disorder characterized by sulfur-deficient brittle hair and multisystem abnormalities (×70)

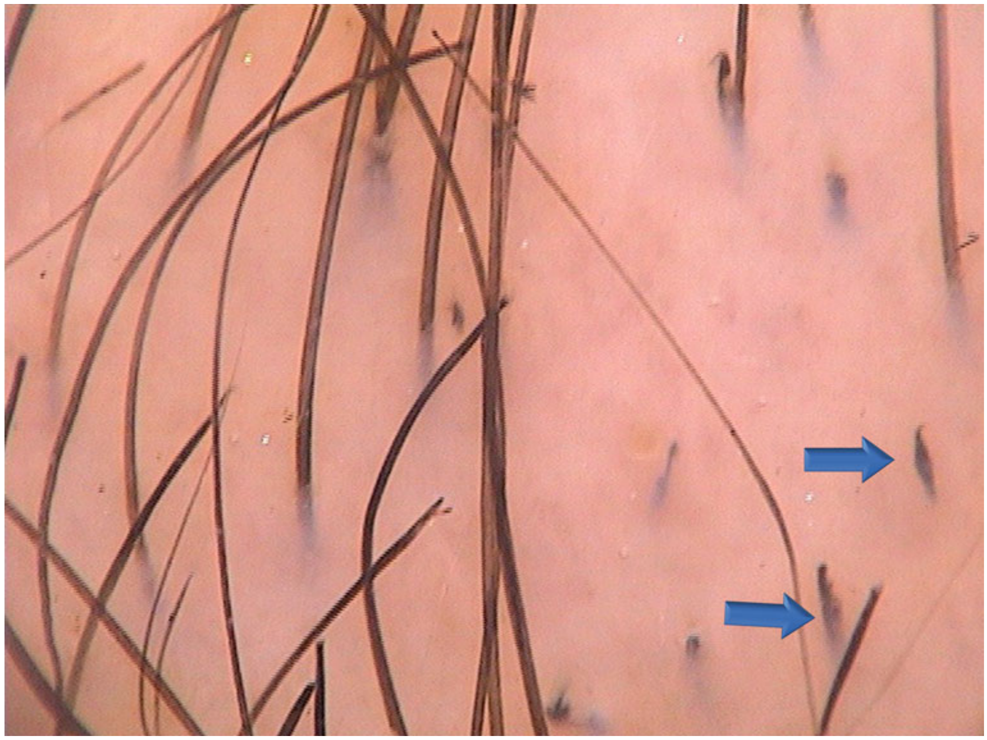

Fig. 2.14 Broken hairs in trichotillomania. This image shows multiple hairs broken by mechanical force in a patient with trichotillomania (*arrows*). The hair shafts have an irregular, ragged distal end, which differs from the regularly split ends in trichoptilosis (also seen in this image). Hairs are broken at different levels above the scalp. A similar image may be observed in traction alopecia, which may be indistinguishable from trichotillomania on trichoscopy. Broken hairs also may be observed in conditions that significantly weaken the hair shafts, such as alopecia areata. In contrast to trichotillomania, in alopecia areata hairs are usually fractured at the same level above the scalp. The length of broken hair shafts in alopecia areata corresponds to hair growth during the period between the onset of increased disease activity and the moment of examination (×70)

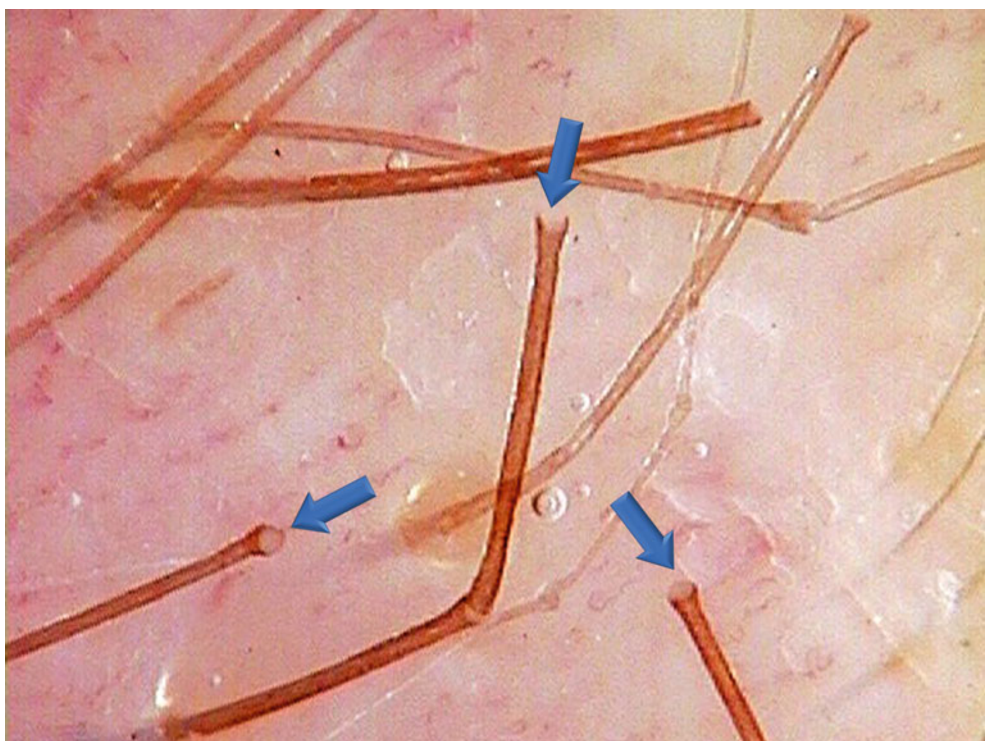

Fig. 2.15 Golf tee hairs in Netherton's syndrome. In trichorrhexis invaginata, the hair shaft telescopes into itself. The proximal part of the abnormality is concave, whereas the distal end is convex (bulging). When the hair shaft breaks at the site of this abnormality, the distal end of the broken hair will have a concave, cupped appearance (*arrows*), which is called "golf tee" hair because it reassembles the plastic tee used to support a golf ball [20]. In the absence of typical bamboo hairs, trichorrhexis invaginata may be diagnosed based on the presence of golf tee hairs only (×70)

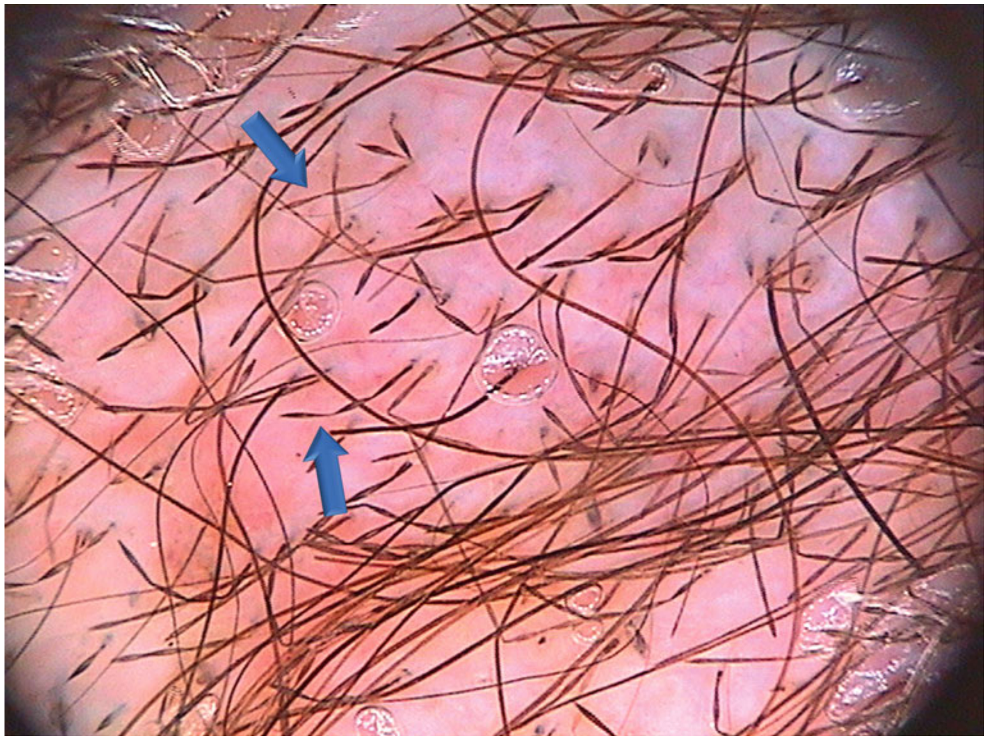

Fig. 2.16 Monilethrix. Typical regularly distributed nodes and internodes are visible within the hair shafts (*arrows*). These nodes correspond to normal hair shaft thickness, whereas the internodes are narrowings. Hair shafts are bent in different directions and tend to fracture at constriction points (×20)

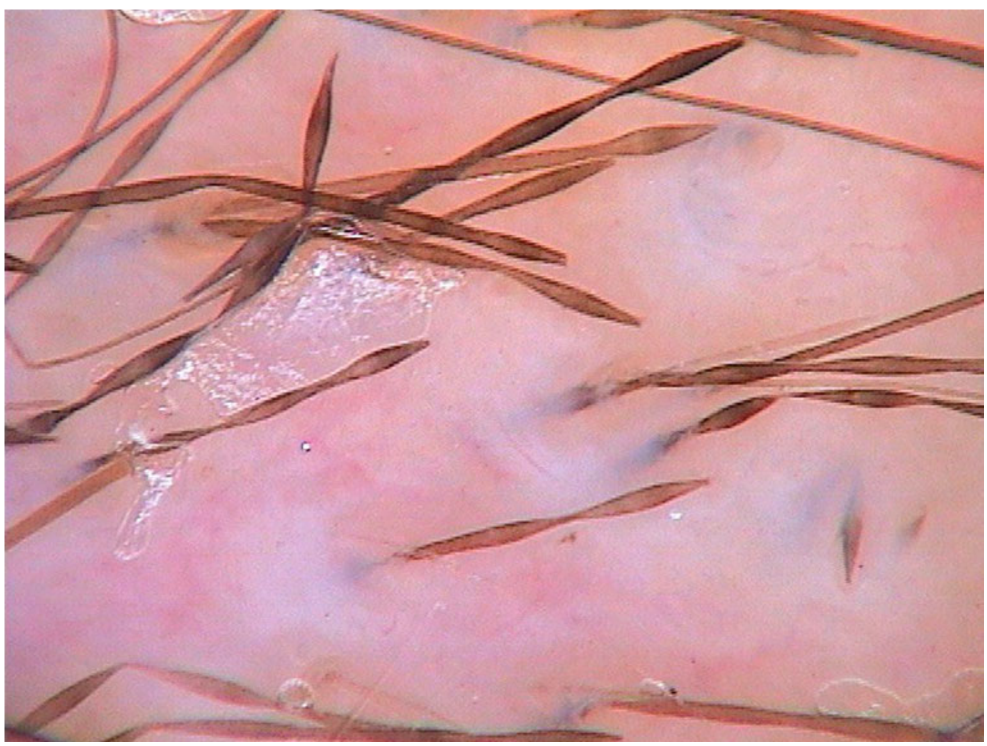

Fig. 2.17 Typical monilethrix hairs with regularly distributed nodes and internodes. In this image, almost all the hair shafts show the abnormality. Usually, only a small proportion of hairs is affected. In patients with only a few monilethrix hairs, this abnormality is most likely to be found in the occipital and parietal areas. Eyelashes rarely are involved (×70)

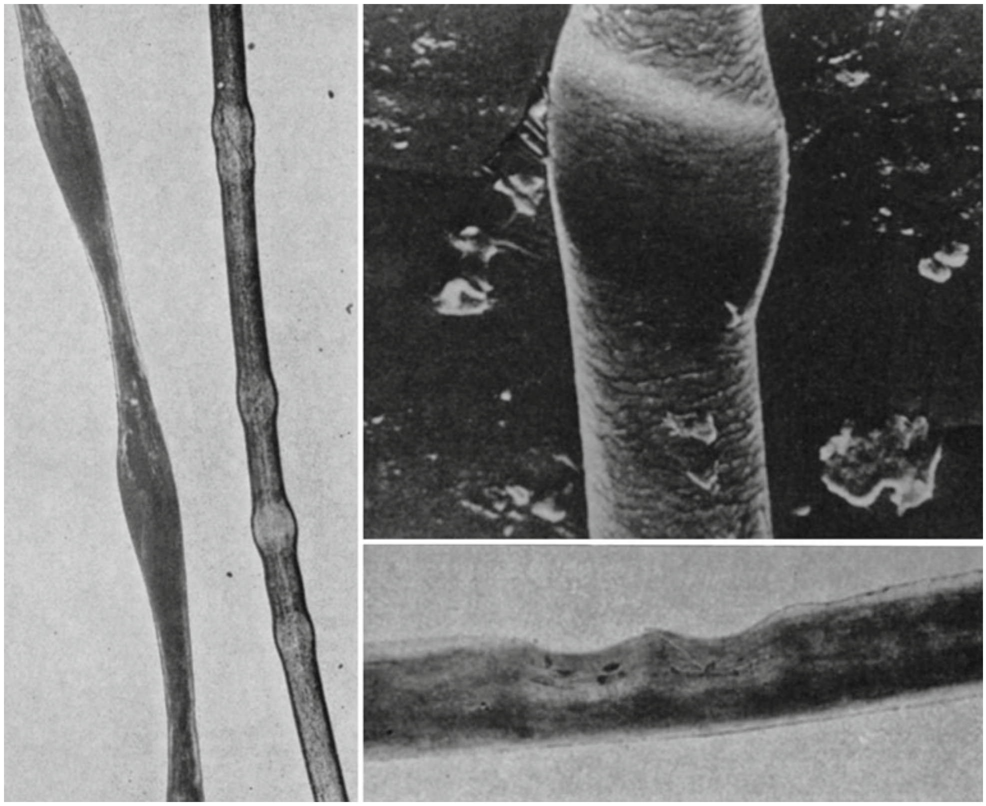

Fig. 2.18 **Pseudomonilethrix**. This image is reproduced from an initial description of the disease observed by Bentley-Phillips et al. [18] in four families from Durban, South Africa. It shows light microscopy of two hair shafts, one with regularly distributed constrictions in monilethrix, and one with irregular nodules in pseudomonilethrix (*left*). The disease differs from monilethrix in that nodes appear thicker than the normal hair shaft and internodes are as thick as a normal hair shaft. The authors showed that this is an optical illusion. Detailed analysis by scanning electron microscopy (*upper right*) and light microscopy (*lower right*) revealed rectangular indentations on one side of the hair shaft. These rectangular indentations in pseudomonilethrix must be differentiated from irregular fusiform narrowing (Pohl-Pinkus constrictions) observed in monilethrix-like hairs following chemotherapy or resulting from the variable course of a chronic disease such as alopecia areata. In a retrospective analysis including more than one million trichoscopic photographs, we did not find this abnormality in our patients (*Image reprinted from* Phillips et al. [18]; *with permission*)

Fig. 2.19 Monilethrix-like congenital hypotrichosis. In monilethrix-like congenital hypotrichosis, the spaces between narrowings are very short (*white arrow*) and are almost invisible in thicker hairs (*blue arrow*). Hairs have a very high tendency to break at the site of the internodes; thus clinically, hair loss is more severe in this condition than in monilethrix (×70)

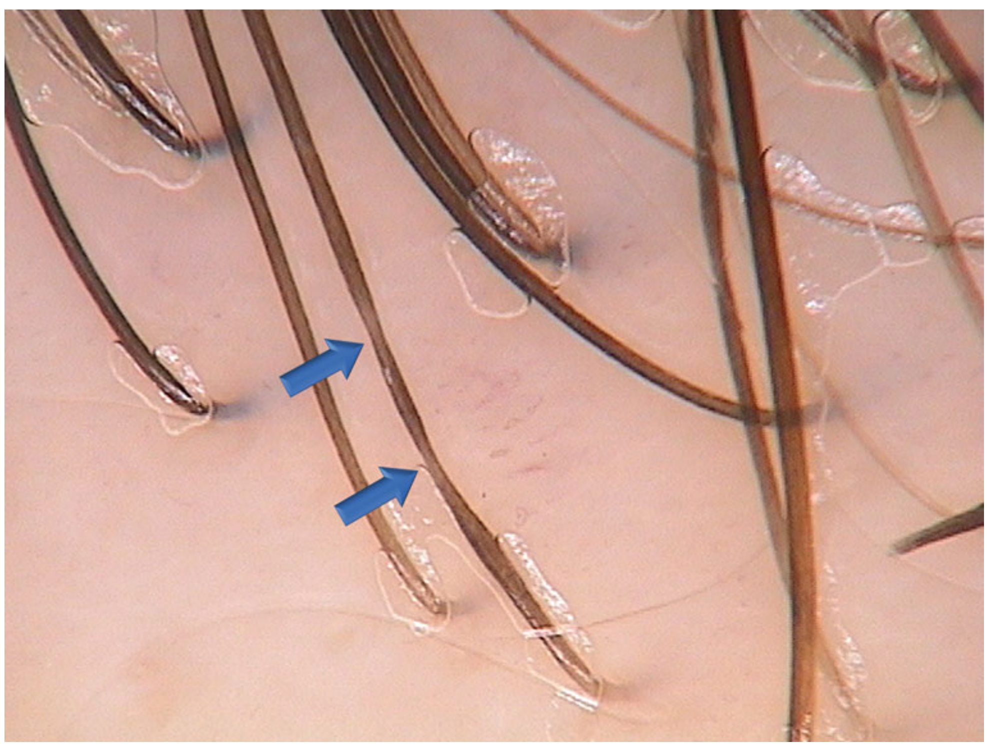

Fig. 2.20 Monilethrix-like hairs in alopecia areata. Irregular hair shaft constrictions (Pohl-Pinkus constrictions; *arrows*) may be observed in various chronic, acquired, and congenital diseases. This abnormality is observed in alopecia areata, cicatricial alopecias, and localized hereditary hypotrichosis, as well as after chemotherapy or interferon alfa-2c therapy. Shown here is a monilethrix-like hair in a patient with alopecia areata (×70)

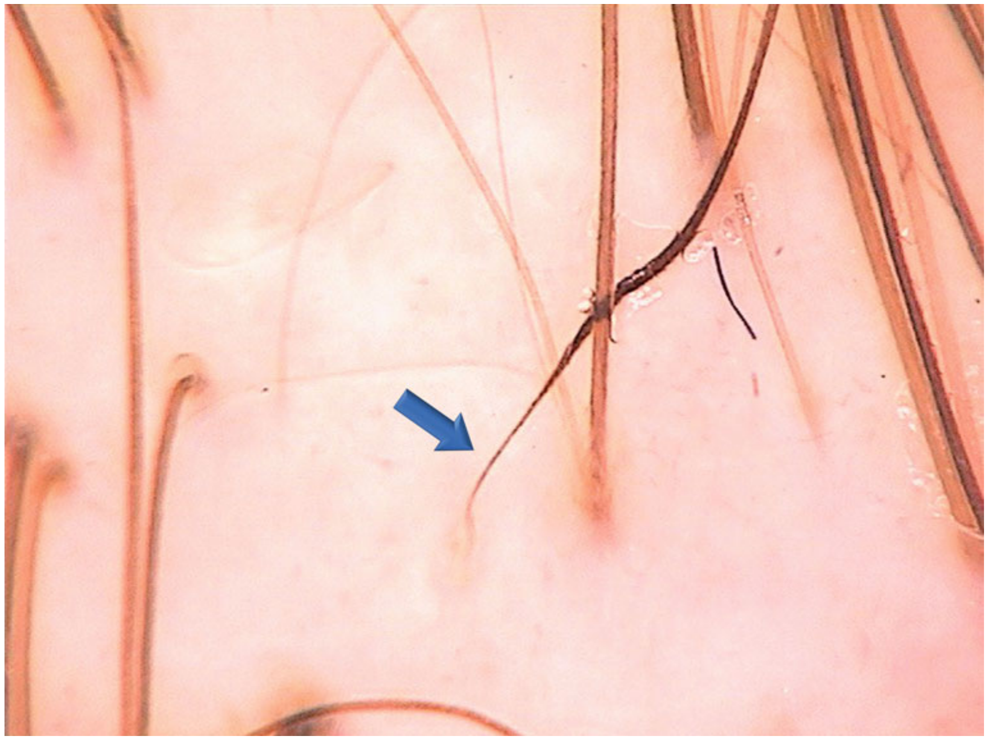

Fig. 2.21 Tapered hairs. Tapered hairs are best described as very long exclamation mark hairs (*arrow*). They are most characteristic for alopecia areata and emerge from follicles that are only partially affected by the disease. As the hair grows, these hairs slowly become thinner with increasing disease activity. A tapered hair corresponds to a very long Pohl-Pinkus constriction. Technically, hairs that are thin at the proximal end and become normal distally are called *tapered hairs* when the hair is longer than one dermoscopic field of view (×70)

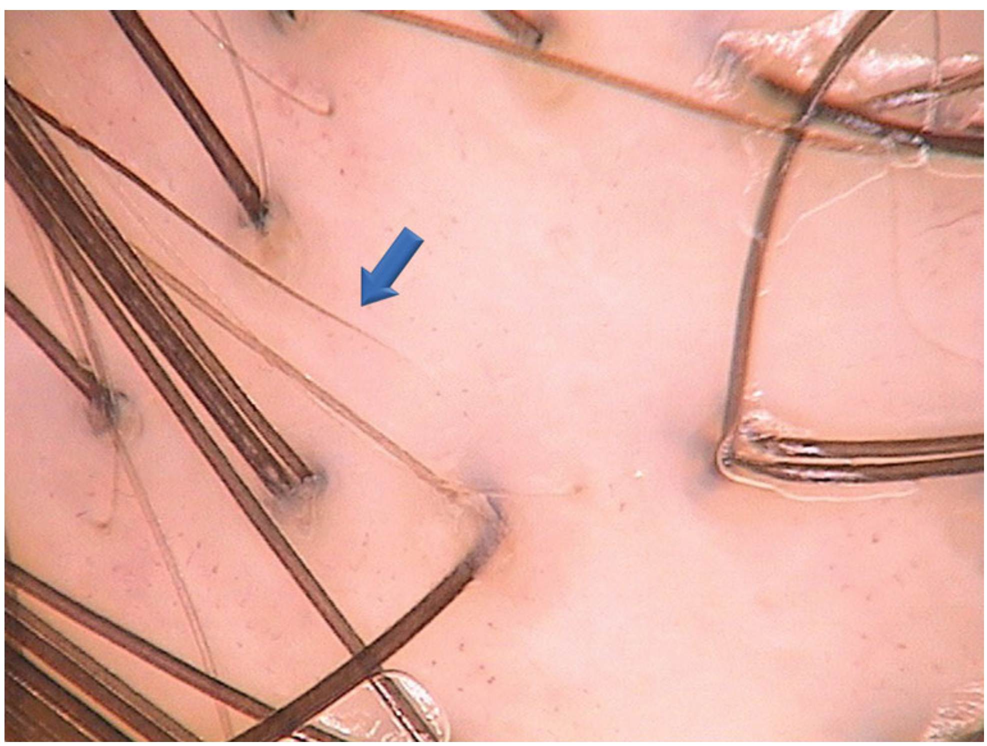

Fig. 2.22 Tapered hairs in alopecia areata. Tapered hairs are thin at the proximal end (*arrow*). In some cases, they become so thin that follicular openings cannot be seen on trichoscopy. Tapered hairs are seen commonly in alopecia areata but are not pathognomonic for the disease (×70)

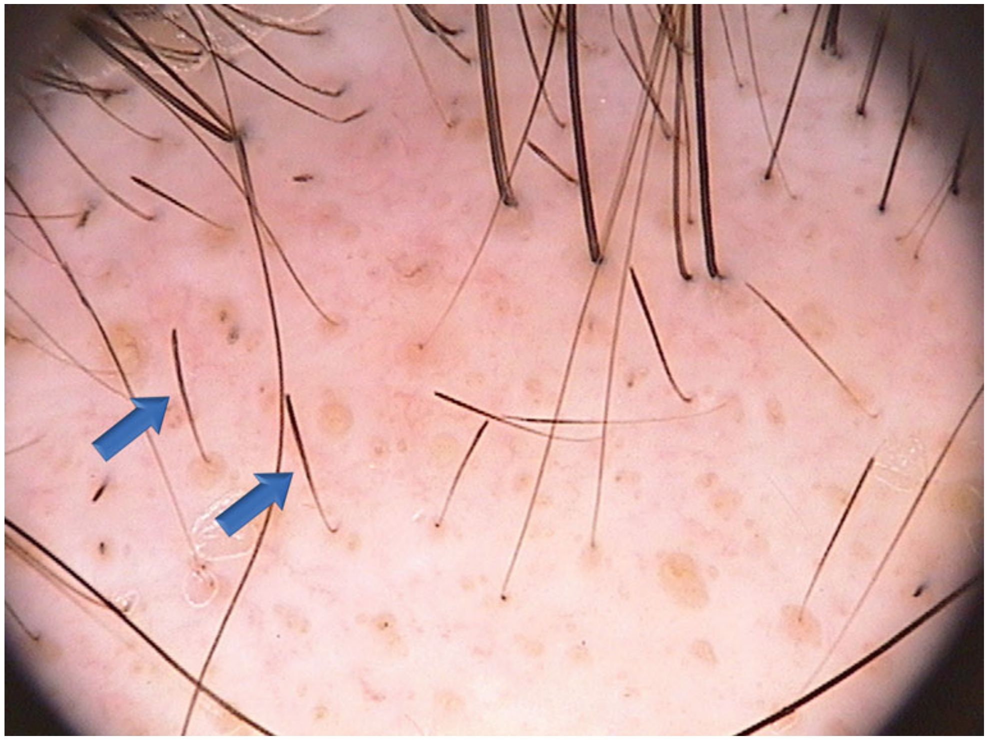

Fig. 2.23 Exclamation mark hairs in alopecia areata. The term *exclamation mark hairs* refers to short hairs that are thin and hypopigmented at the proximal end and thicker and darker at the distal end (*arrows*). Trichoscopy allows visualization of exclamation mark hairs shorter than 1–2 mm (micro–exclamation mark hairs). Exclamation mark hairs are most characteristic of, but not specific for, alopecia areata. Also shown are black dots and regularly distributed yellow dots, a hallmark of alopecia areata (×20)

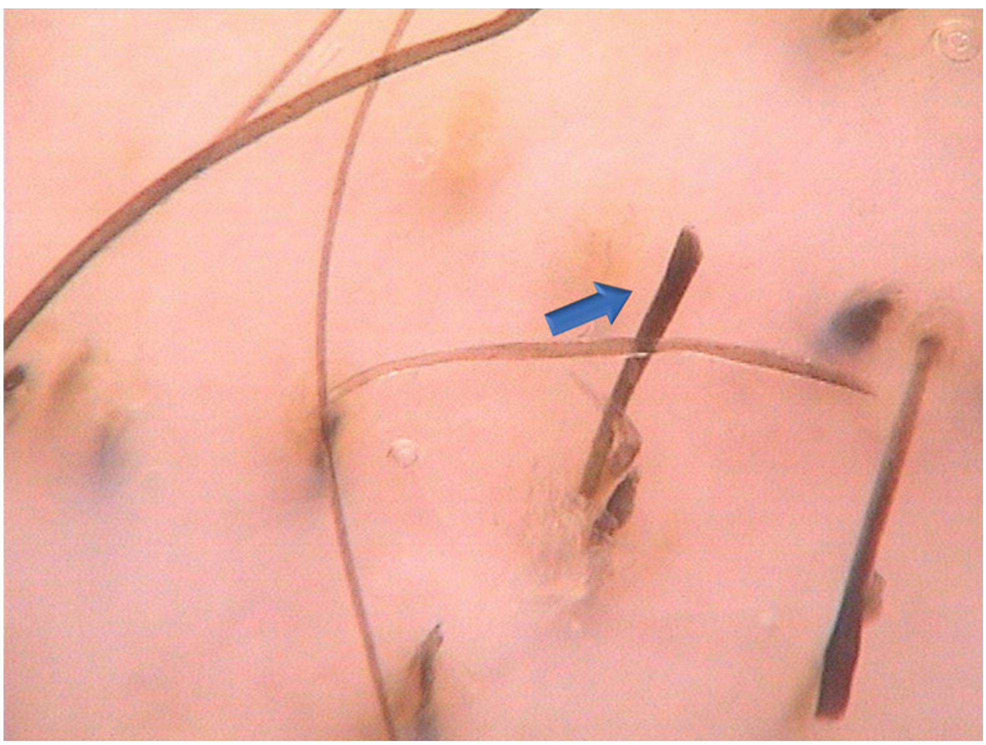

Fig. 2.24 Exclamation mark hairs in trichotillomania. Exclamation mark hairs may lead to a misdiagnosis of alopecia areata because they are commonly believed to be pathognomonic for alopecia areata. This image shows exclamation mark hairs (*arrow*) in a patient with trichotillomania. A study using light microscopy showed that most exclamation mark hairs in patients with alopecia areata have frayed distal ends, whereas most exclamation mark hairs from trichotillomania patients have blunt distal ends [21]. This difference is not observed on trichoscopy. Our experience shows that exclamation mark hairs in alopecia areata tend to have a hypopigmented proximal end and a pointed distal end, whereas most exclamation mark hairs in trichotillomania have a dark proximal end and a flat distal end. The differentiation may be especially problematic in patients with coexisting alopecia areata and trichotillomania (×70)

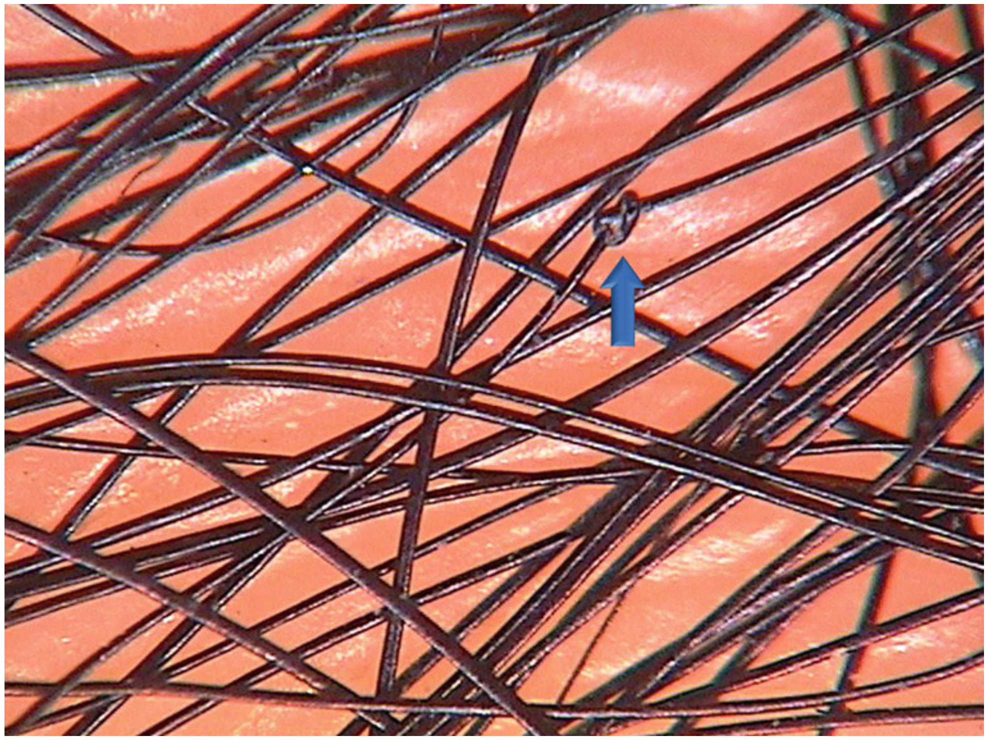

Fig. 2.25 Trichonodosis. Trichonodosis (hair knotting) is an acquired, transient condition in which a single or double knot occurs in the hair shaft (*arrow*), either spontaneously or in response to scratching. It is observed in patients with short, curly hair. Trichonodosis is usually an incidental finding of little clinical significance (×70)

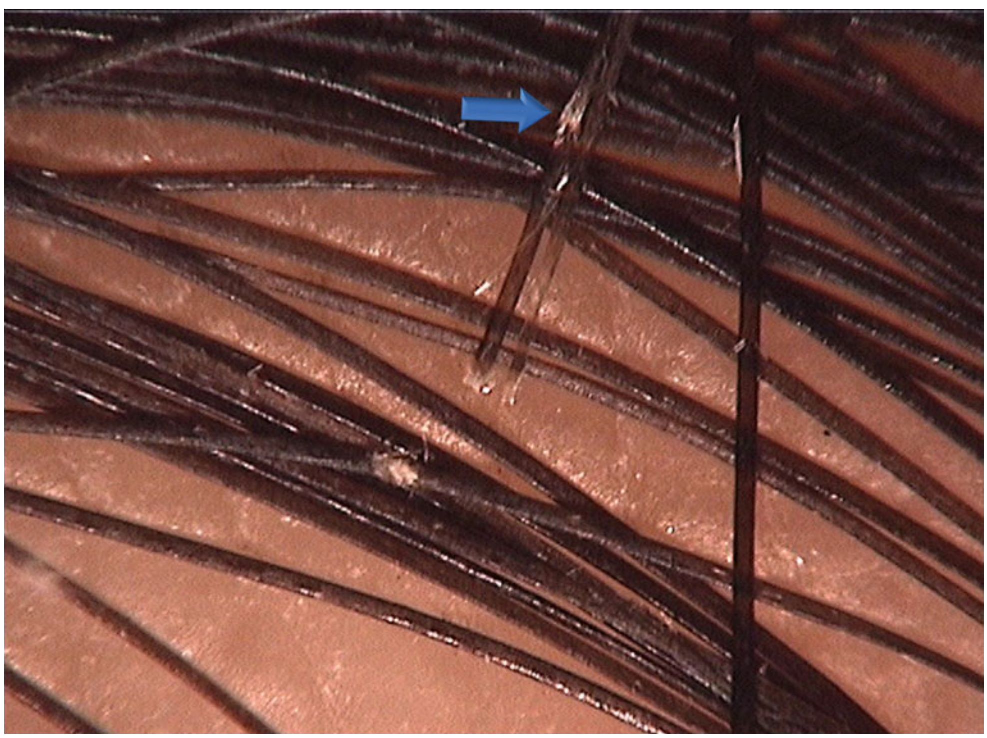

Fig. 2.26 Trichorrhexis nodosa. In trichorrhexis nodosa, the hair develops a restricted area in which the shaft splits longitudinally into numerous small fibers. The outer fibers bulge outward, causing a segmental increase in hair diameter. Trichoscopy may give slightly different images depending on magnification and technique. At high magnifications and in dry trichoscopy, as in this image, the split hair shaft appears as two white brushes aligned in opposition (*arrow*). At low magnifications, trichoscopy shows nodular thickenings along the hair shaft. These thickenings appear light in the darker hair shaft (×70)

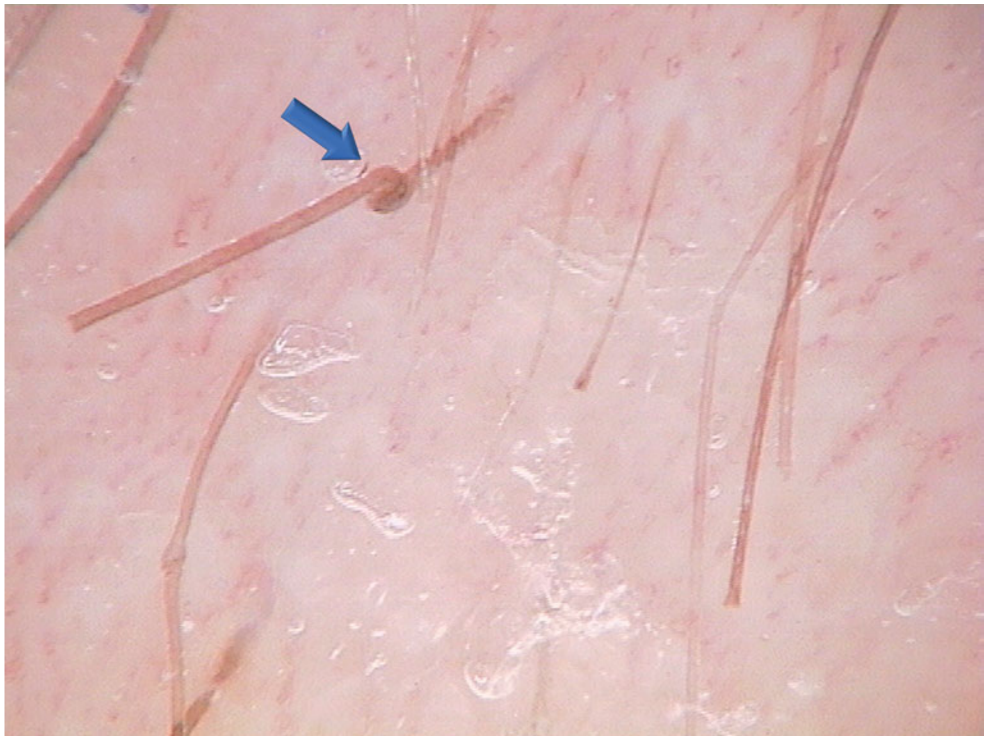

Fig. 2.27 Bamboo hair in Netherton's syndrome. Bamboo hairs are a manifestation of trichorrhexis invaginata, a hallmark of Netherton's syndrome. In trichorrhexis invaginata, the hair shaft telescopes into itself (*arrow*). The proximal part of the abnormality is concave, whereas the distal end is convex (bulging). This produces a nodular swelling along the hair shaft with a "ball in a cup" appearance. The presence of many of these nodes along the hair shaft gives it the appearance of a bamboo tree (×70)

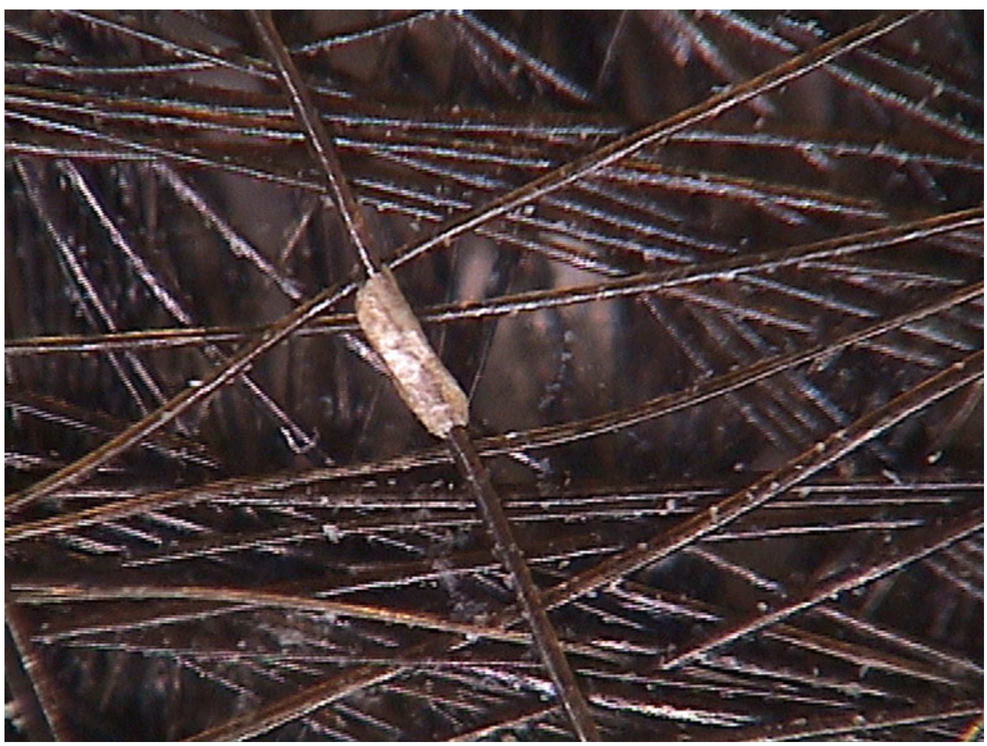

Fig. 2.28 Hair cast in lichen planopilaris. Hair casts (peripilar keratin casts) are firm, white, freely movable tubular masses that encircle the hair shafts. Historically, these also were called "pseudonits," because macroscopic evaluation of these structures may lead to an erroneous diagnosis of pediculosis capitis. Hair casts may be a secondary phenomenon in the course of psoriasis, seborrheic dermatitis, or lichen planopilaris. Idiopathic hair casts may be observed in healthy individuals. This image shows a hair cast in a patient with active lichen planopilaris (×70)

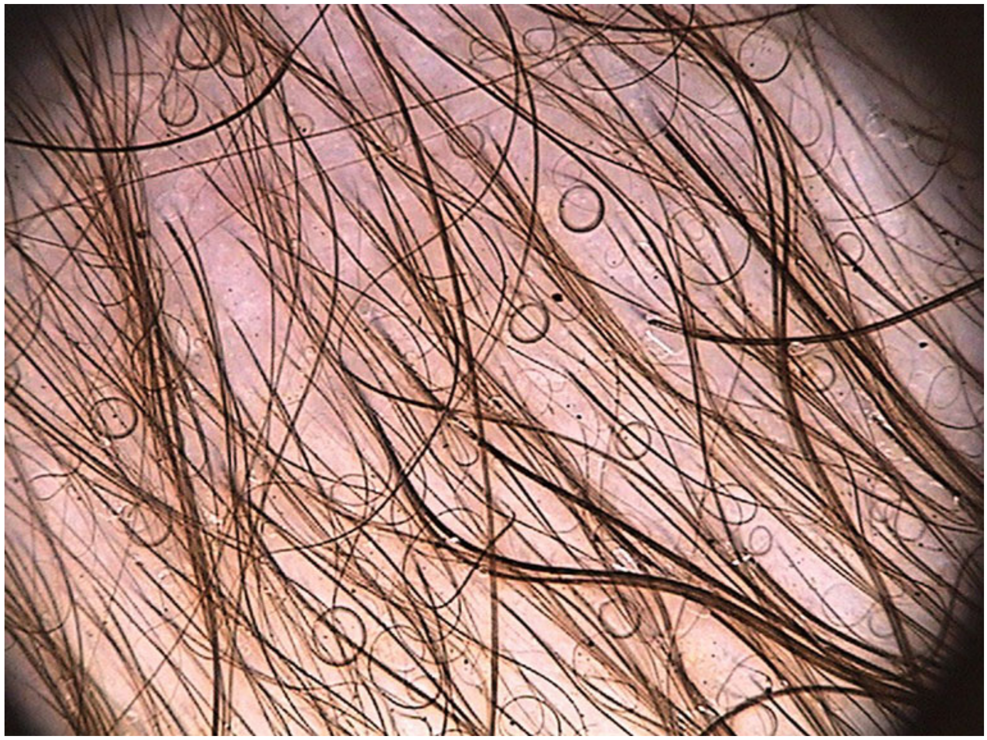

Fig. 2.29 Pigtail hairs in alopecia areata. Regrowing pigtail hairs are short, regularly twisted hairs with tapered ends and resemble a pig's tail. They may be circular or oval. Shown here is a trichoscopic image from a patient with alopecia areata with unusual hair regrowth due to hair cycle synchronization after intralesional triamcinolone injections. Solitary regrowing pigtail hairs also may be observed in cicatricial alopecia (×20)

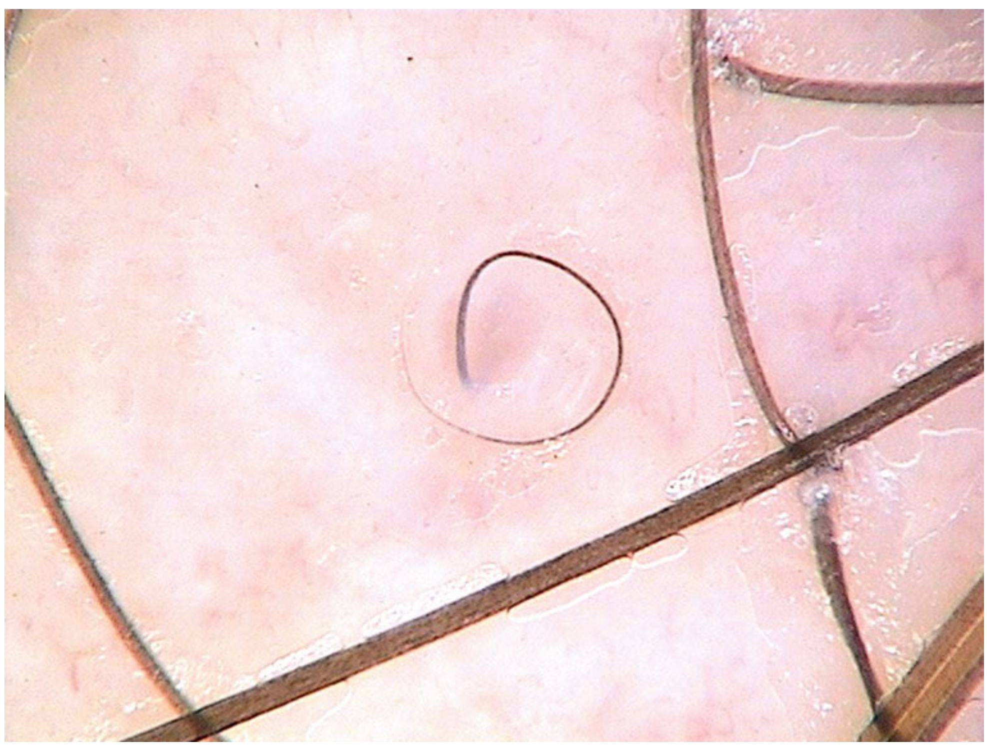

Fig. 2.30 Pigtail hair in lichen planopilaris. Regrowing pigtail hairs most probably result from rapid hair regrowth, before full recovery of the hair follicle. Although most characteristic for alopecia areata, regrowing pigtail hairs also may be present in cicatricial alopecia. This image shows a regrowing pigtail hair in a patient with lichen planopilaris. The hairs are regularly twisted and have tapered (pinpoint) distal ends. In this regard, they differ from irregular coiled hairs (×70)

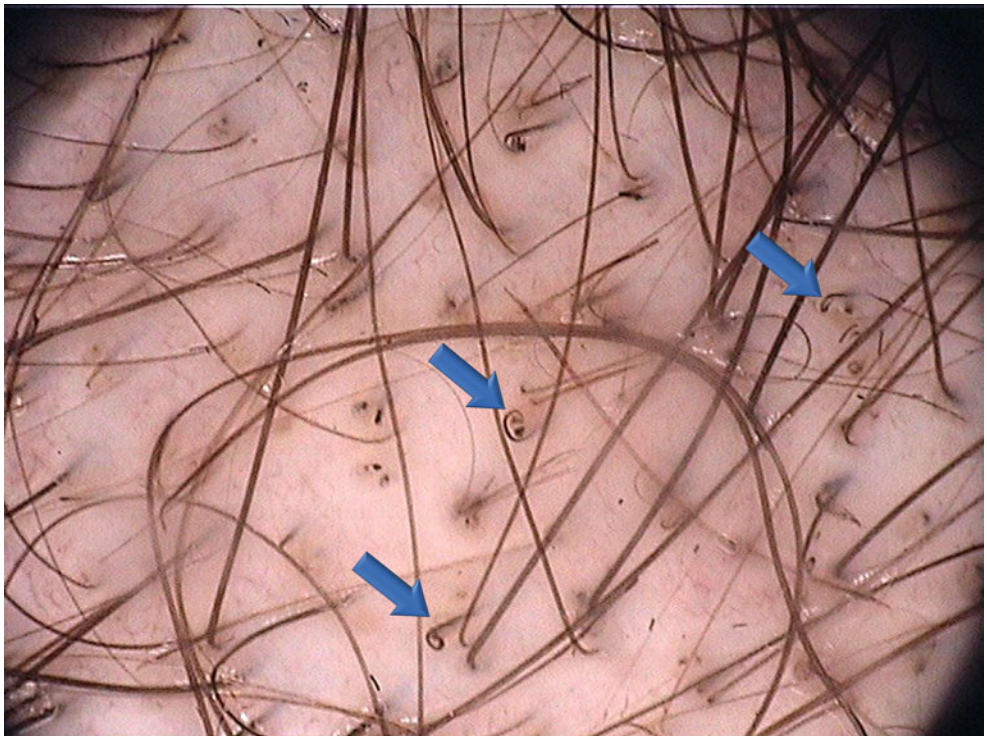

Fig. 2.31 Coiled hairs in trichotillomania. Irregularly coiled hairs observed in trichotillomania develop as a result of hair-pulling tension force. After fracturing, the remaining part of the hair coils irregularly at the fracture site (*arrows*). The appearance of the coiled hair depends on the tension, pulling direction, length of the remaining hair, and hair growth after the moment of pulling. In patients with multiple coiled hairs, this will result in each coiled hair having a different appearance (×20)

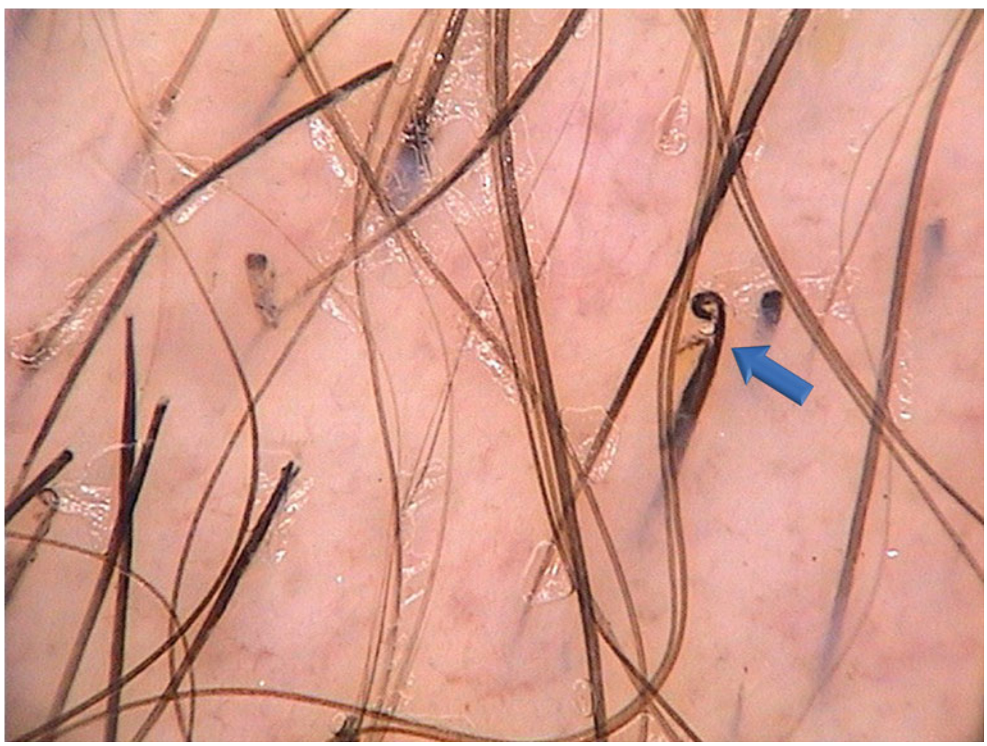

Fig. 2.32 Coiled hairs in trichotillomania. Irregular coiled hairs are most typical of trichotillomania but also may be present in small numbers in patients with traction alopecia and in healthy individuals as a result of hair pulling during hairstyling procedures. The fractured, irregular coiled hairs differ from regrowing pigtail hairs in their irregular, oval appearance and blunt end. Occasionally, they may have a hook-like appearance (*arrow*; ×70)

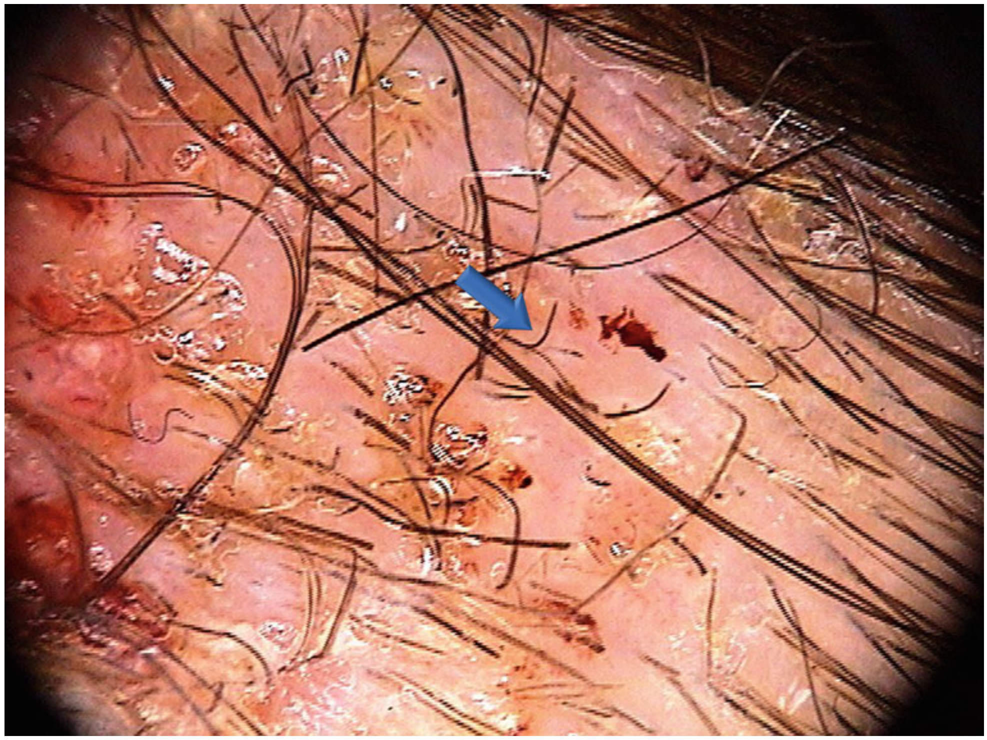

Fig. 2.33 Comma hairs in tinea capitis. These short comma-like hairs are characterized by homogeneous thickness and pigmentation of the hair shaft and a sharp diagonal end (*arrow*). As first described by Slowinska et al. [10], the presence of multiple comma hairs in focal alopecia is pathognomonic for tinea capitis. Single hairs that curl into a comma-like structure occasionally may be observed in healthy individuals with very short hair and during hair regrowth in alopecia areata (×20)

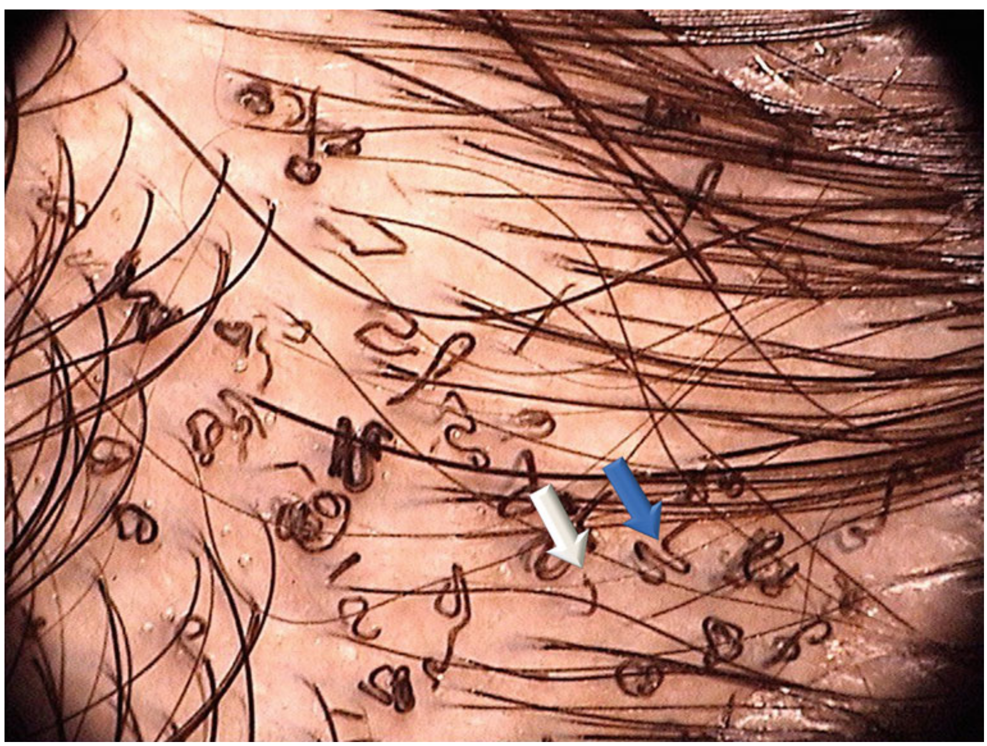

Fig. 2.34 Corkscrew hairs in tinea capitis. Hairs curling into corkscrew structures were first identified in a black child with tinea capitis in France and described by Hughes et al. [12]. Our experience shows that corkscrew hairs (*blue arrow*) are a hallmark of tinea capitis in patients of all skin phototypes. However, the curls are more common and more prominent in patients with dark skin phototypes. These corkscrew hairs should not be confused with those observed on light microscopy in children with ectodermal dysplasia [22–24]. Comma hairs (*white arrow*) often coexist with corkscrew hairs. They are shorter and show less curling than corkscrew hairs (×20)

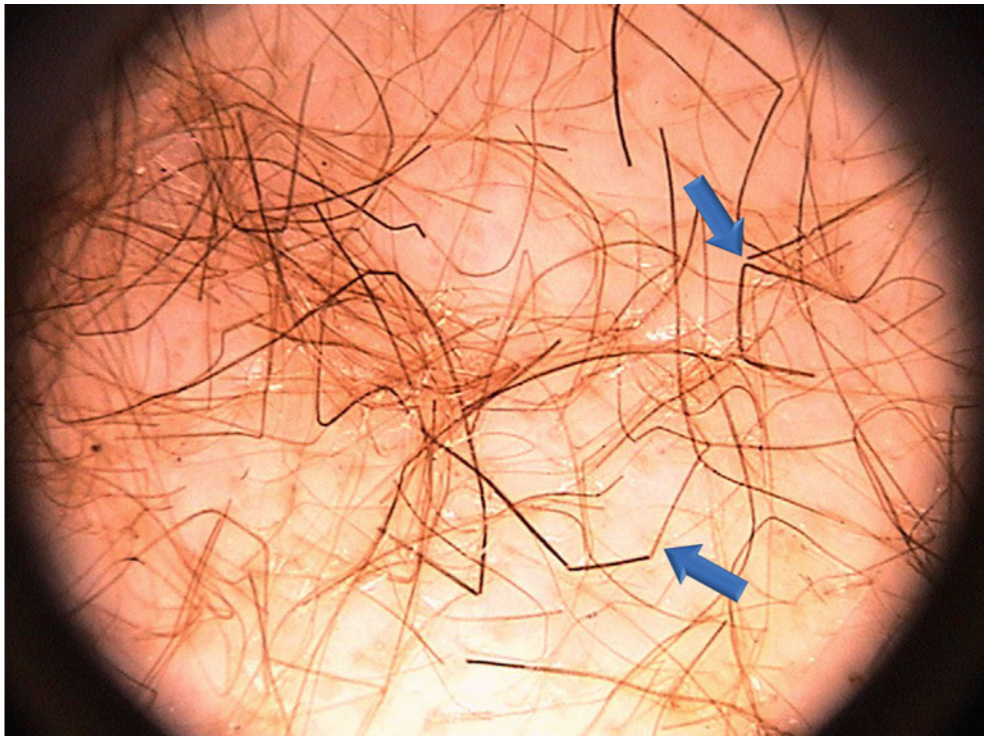

Fig. 2.35 Zigzag hairs in tinea capitis. Hairs that form zigzag structures (also called Z-hairs; *arrows*) are observed in tinea capitis, alopecia areata, trichorrhexis nodosa, and other diseases that cause focal weakening of the hair shaft [13]. They are not pathognomonic for tinea capitis (×20)

Fig. 2.36 Pili torti. In pili torti, the affected hair is flattened and twisted on its own axis at irregular intervals, usually at a 180° angle (*arrow*). Pili torti has numerous causes, both inherited and acquired. See Chap. 11 for details (×20)

Fig. 2.37 Woolly hair. The term *woolly hair* refers to an abnormal variant of hair with tightly coiled curls. The hairs are often thin and hypopigmented. Three variants of woolly hair have been distinguished based on clinical and light microscopic investigation: local woolly hair nevus and two generalized variants, autosomal dominant hereditary woolly hair and autosomal recessive familial woolly hair. Trichoscopy has revealed that hairs fulfilling the definition of *woolly hairs* are more common than previously reported (×70)

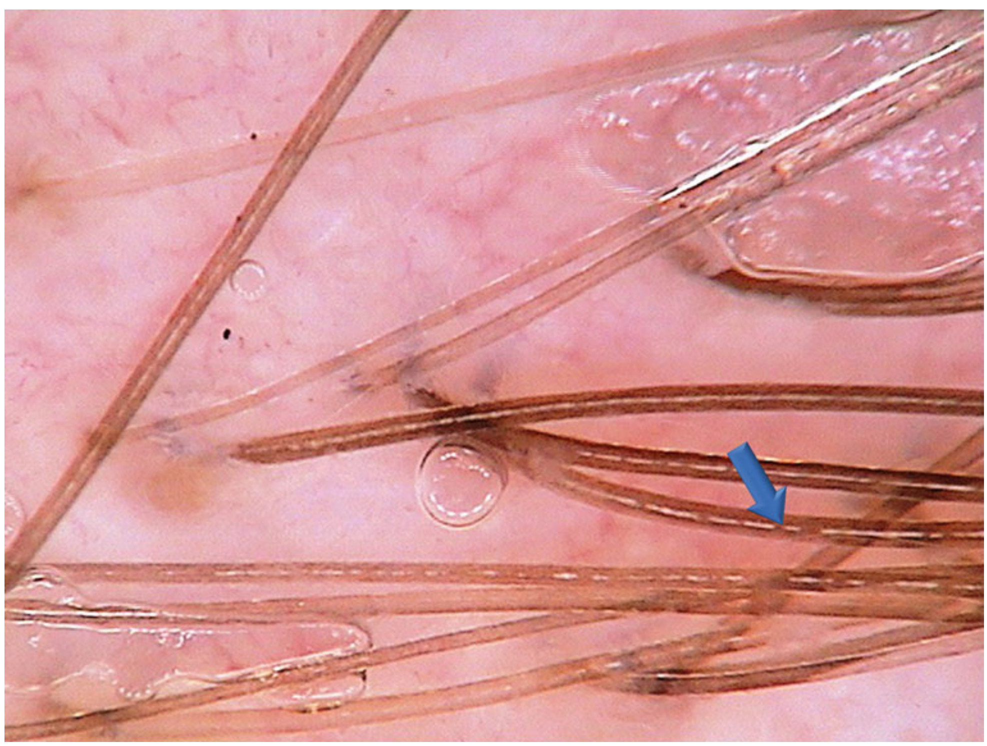

Fig. 2.38 Interrupted and fragmented medulla in a normal hair shaft. In normal hair shafts, trichoscopy allows visualization of the medulla, which appears as a longitudinal white band along the midpart of the hair shaft. The medulla may be continuous, interrupted, fragmented, or absent [3]. The trichoscopic impression of the "fragmented" medulla (*arrow*) is in fact a thick medulla intercalated with a thin medulla, which is not visible on trichoscopy. The thickness or presence of the medulla is believed to have no influence on hair shaft properties (×70)

Fig. 2.39 Interrupted and fragmented medulla in a normal hair shaft. All the hair shafts in this image have an interrupted white line in their midpart. An interrupted medulla may be differentiated from pili annulati in that it covers less than 50 % of the hair shaft thickness (×50)

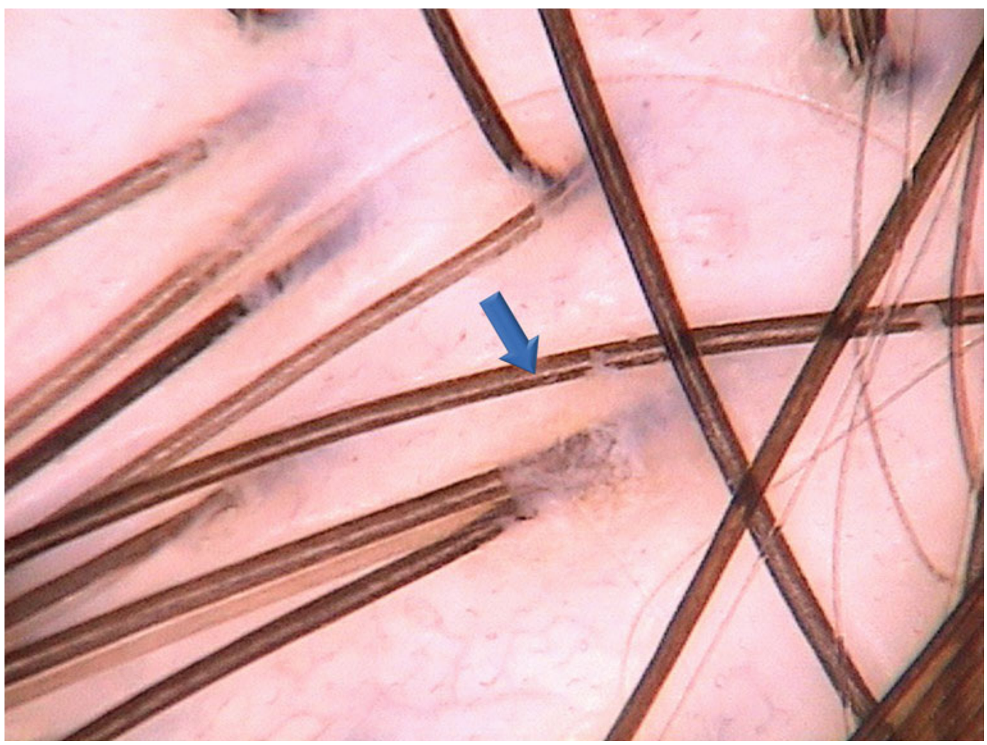

Fig. 2.40 Continuous medulla in normal hair shafts. Thick terminal hairs often have a continuous medulla, which is a white midline thinner than 50 % of the hair shaft thickness (*arrow*). A continuous medulla is observed most commonly in the Asian population (×70)

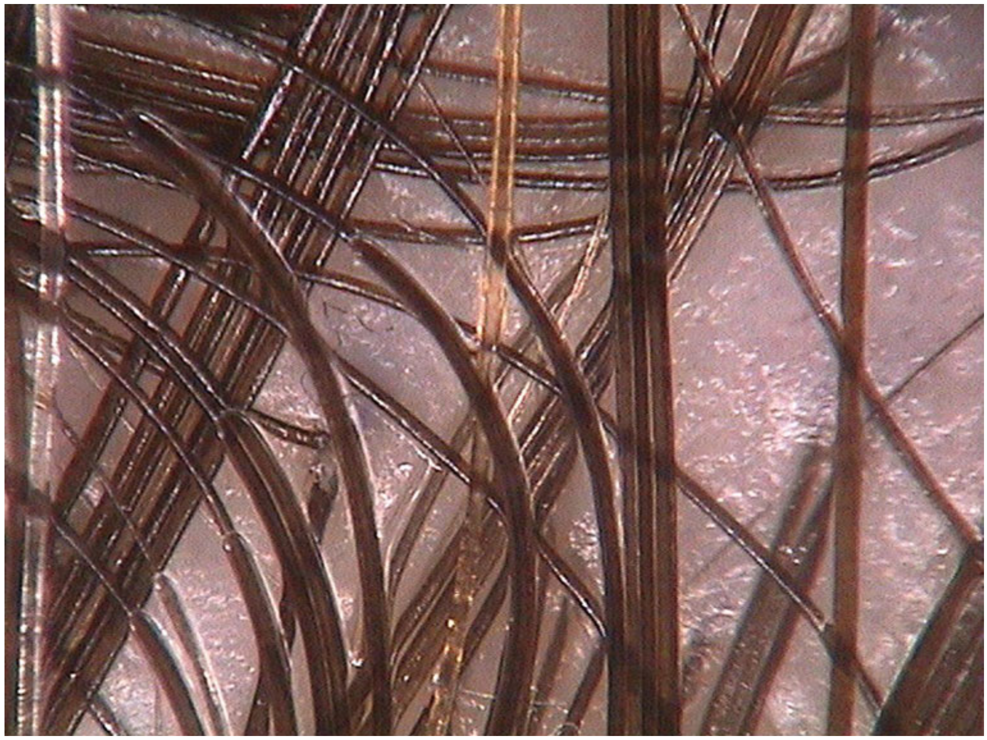

Fig. 2.41 Absent medulla in normal hair shafts. Note that in this image, most of the hair shafts are uniform in color and no medulla is visible. This also is in normal range (×70)

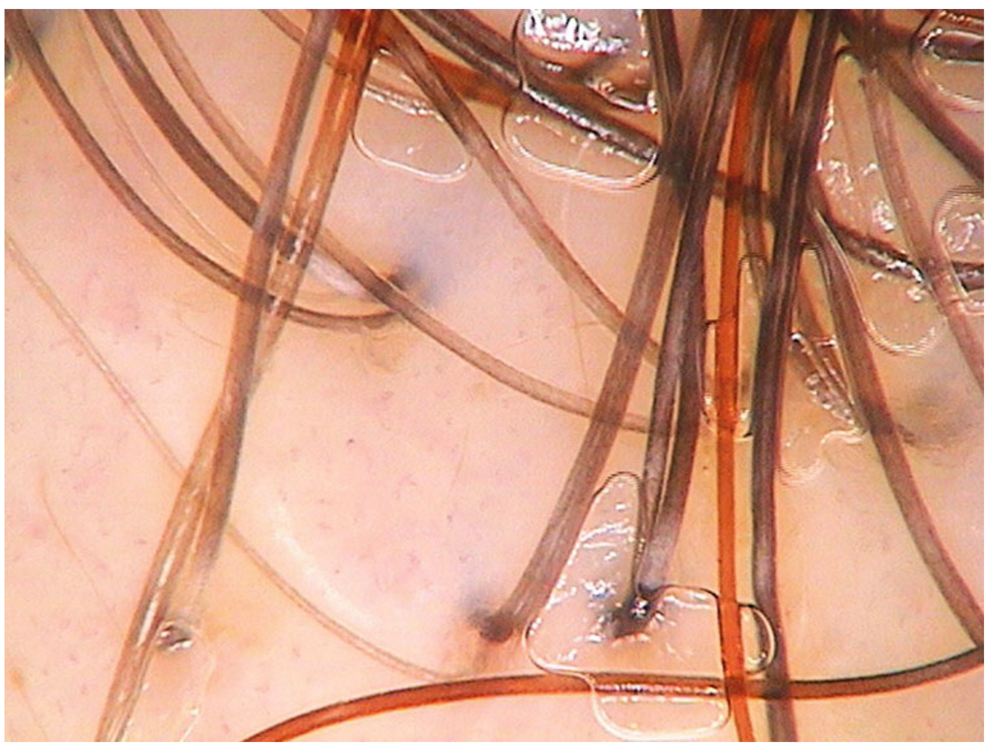

Fig. 2.42 Hair shafts with light whitish bands in pili annulati. Note that these bands are nearly the width of a hair and their borders are not clear-cut, which differentiates white bands in pili annulati from an interrupted medulla (×70)

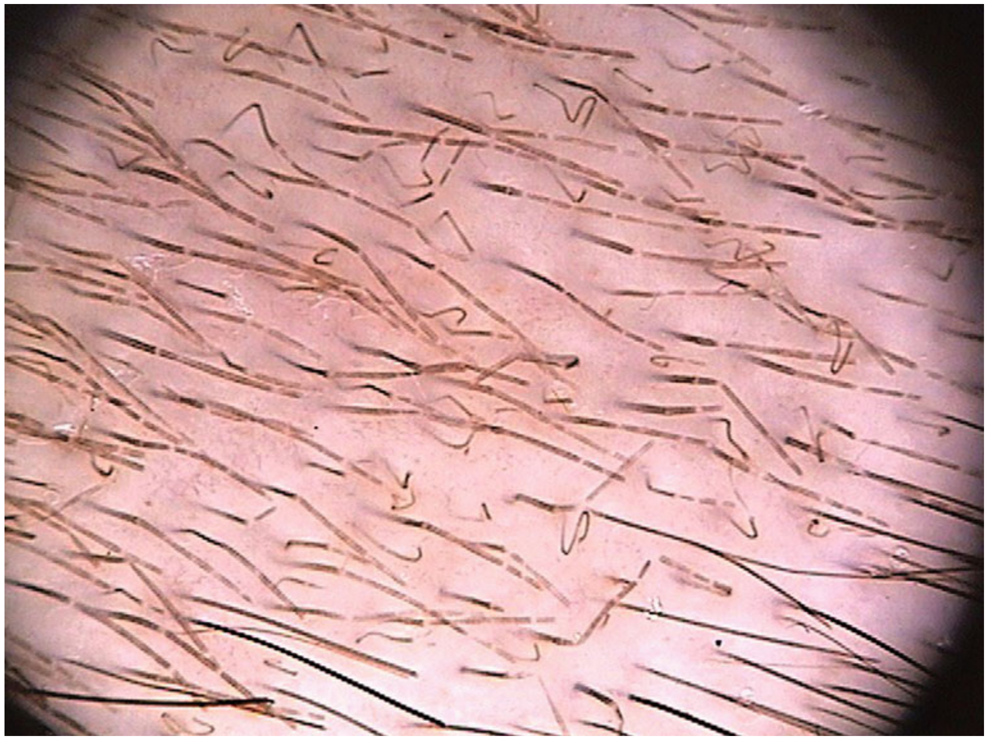

Fig. 2.43 Interrupted hairs in tinea capitis. Interrupted hairs (Morse code–like hairs) with multiple thin white bands across the hair shaft were first observed in our patients with tinea capitis due to *Microsporum canis* and described by Rudnicka et al. [13]. The specificity of this finding is a subject for further investigation (×20)

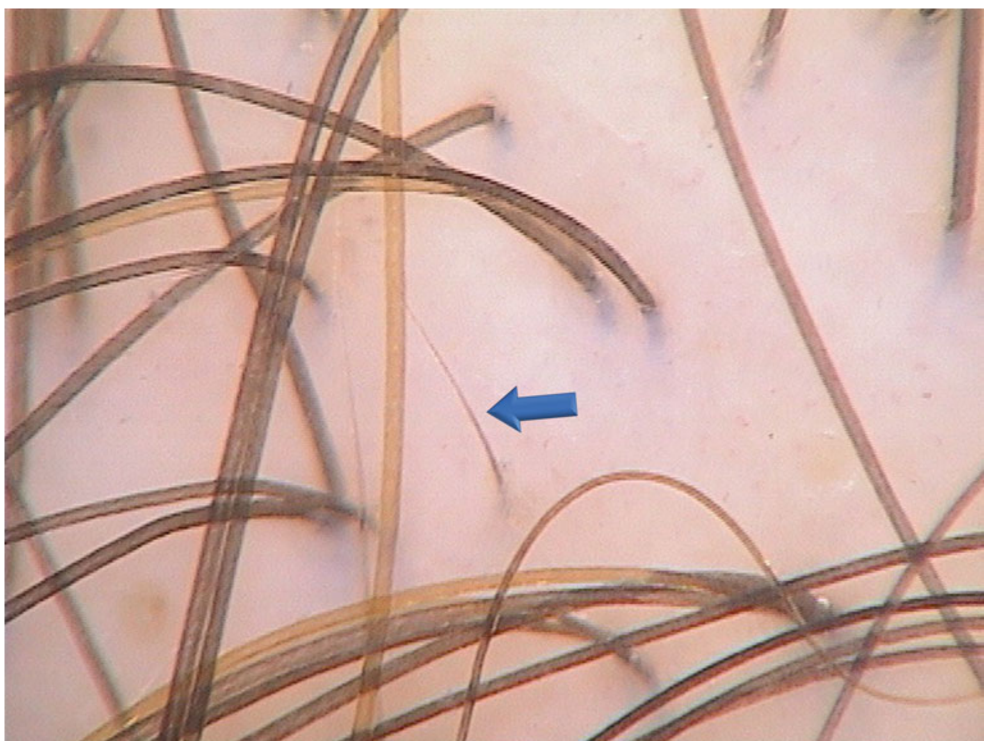

Fig. 2.44 Upright regrowing hair in a healthy individual. New, upright regrowing hairs are a sign of hair regrowth in healthy individuals. The presence of multiple upright regrowing hairs is characteristic of the hair regrowth phase in telogen effluvium but also may be observed in other types of noncicatricial alopecia. These hairs look different from the delicate, thin, vellus hairs seen in androgenetic alopecia. Note the tapered end and continuous hair shaft thickening toward the follicular opening (*arrow*; ×70)

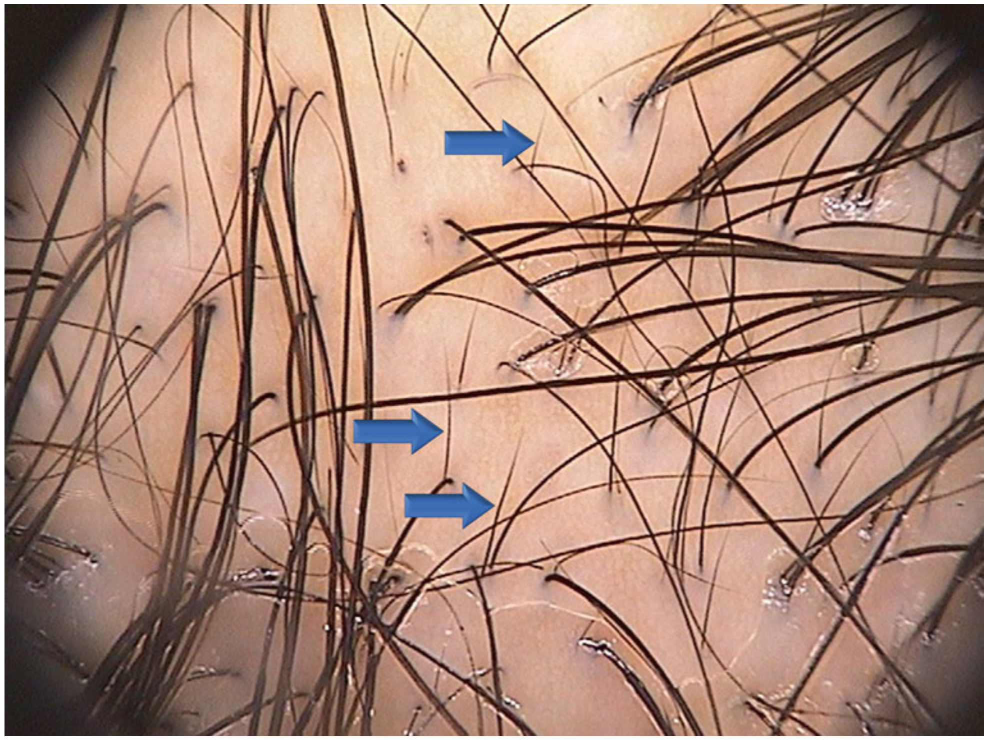

Fig. 2.45 Upright regrowing hairs in telogen effluvium. The presence of multiple upright regrowing hairs (*arrows*) is the effect of hair cycle synchronization and the simultaneous regrowth of hairs. This is one of the most characteristic (but not specific) trichoscopic features of telogen effluvium (×20)

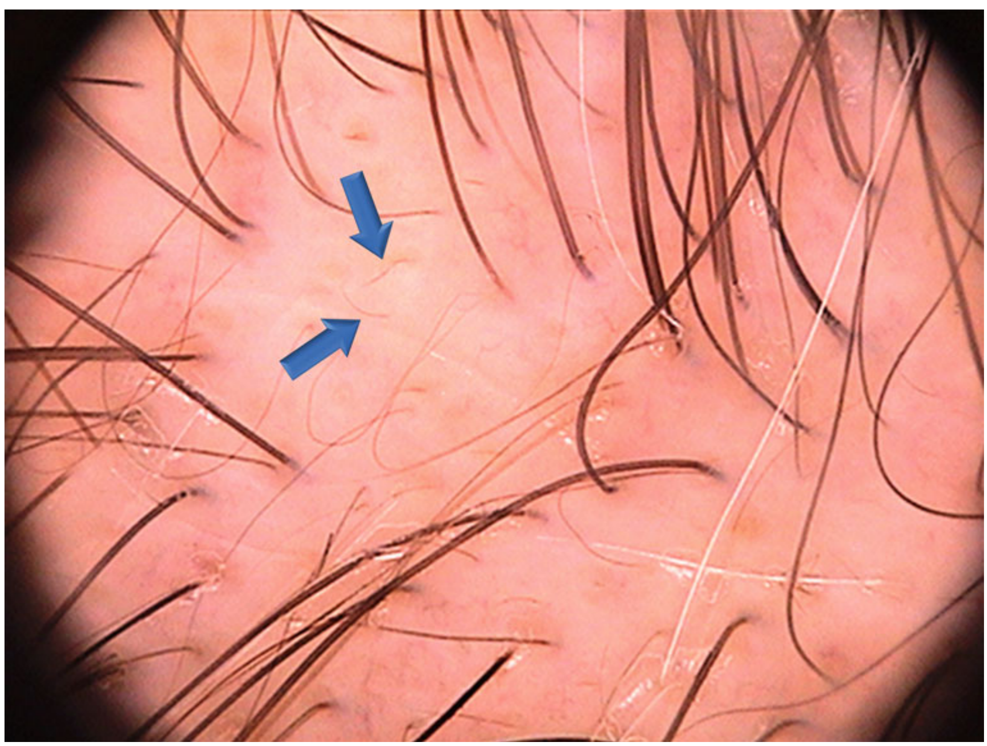

Fig. 2.46 Vellus hairs in androgenetic alopecia. In this image, almost 30 % of the hair shafts are vellus hairs (*arrows*). These hairs are hypopigmented, nonmedullated, less than 30 μm thick, and less than 3 mm long. They are delicate, thin, and short. Up to about 10 % of normal human scalp hairs are vellus hairs. An increased proportion of vellus hairs is characteristic of male and female androgenetic alopecia (×20)

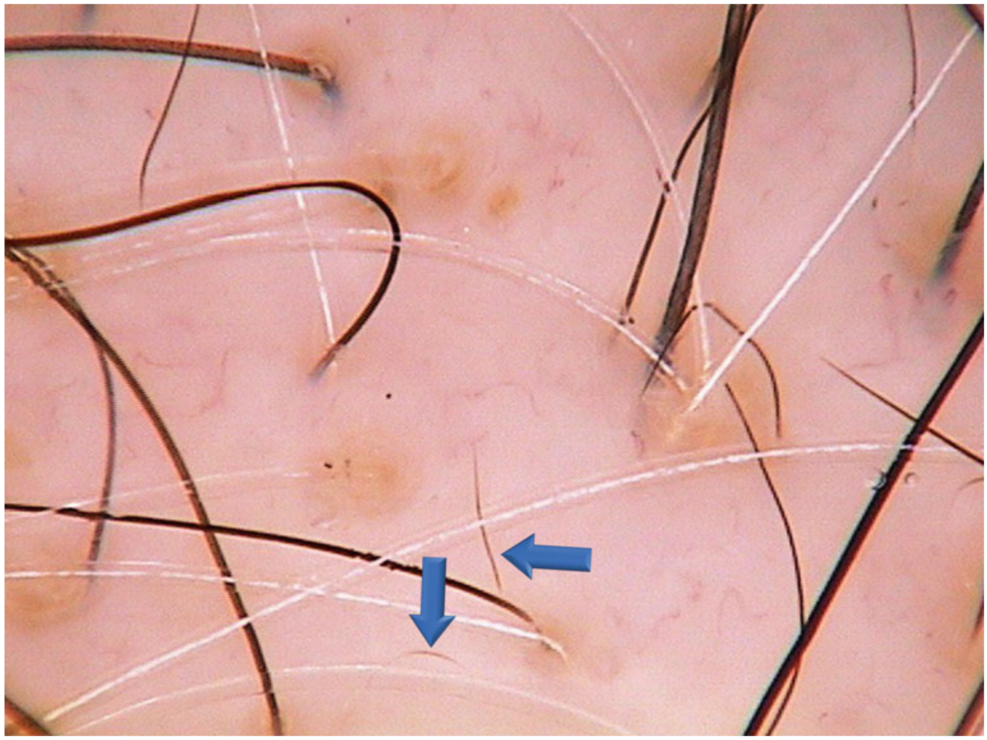

Fig. 2.47 Dark lines. Dark lines are hairs that are thin and short but very dark (*arrows*). Occasionally, they are darker than the patient's natural hair color. Their characteristic feature is that it is difficult to determine at which end of the hair the follicle is located. Dark lines are present in noncicatricial alopecia, most commonly alopecia areata incognita (×70)

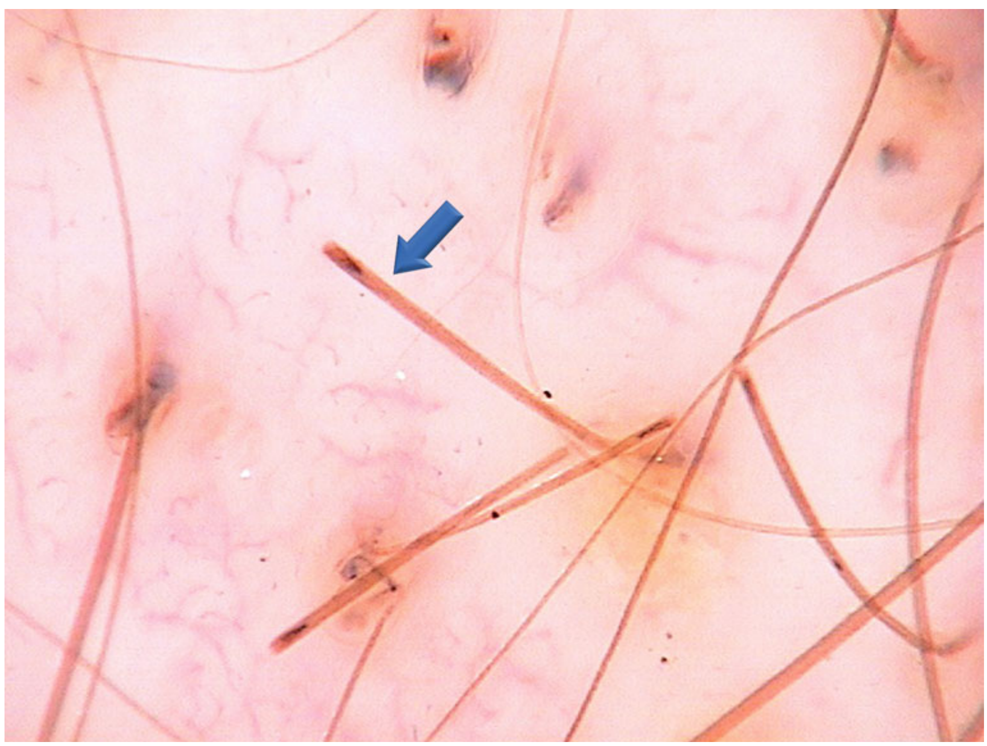

Fig. 2.48 Tulip hairs in trichotillomania. Tulip hairs tend to be slightly thinner at the base than at the distal end and show a tulip leaf–like hyperpigmentation at the distal end (*arrow*). These short hairs are seen in patients with trichotillomania and alopecia areata (×70)

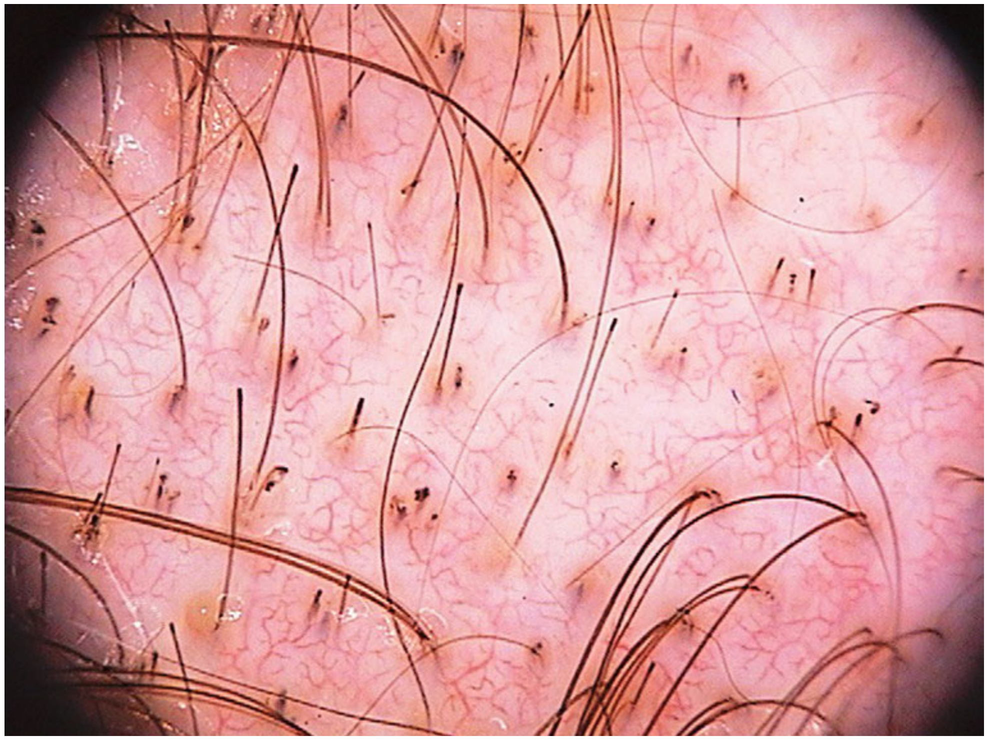

Fig. 2.49 Tulip hairs in trichotillomania. At low magnification, tulip hairs appear as light-colored hair shafts with dark distal ends. They most likely correspond to broken hairs with a diagonal fracture surface and a cuticle detached at the distal end. Tulip hairs are characteristic of, but not pathognomonic for, trichotillomania (×20)

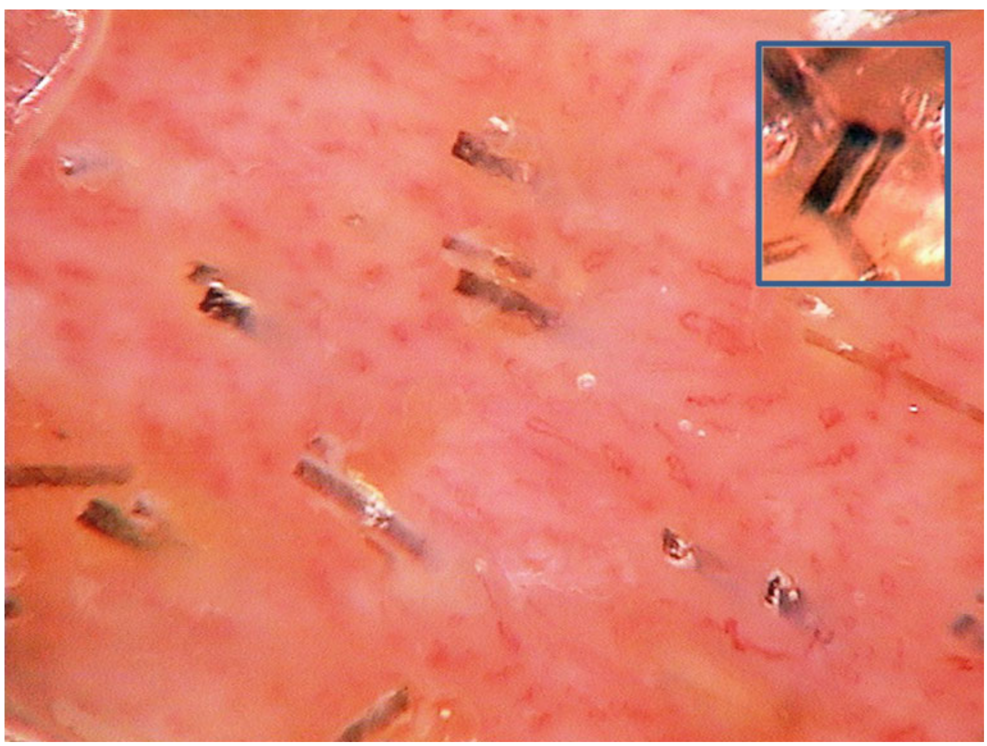

Fig. 2.50 Hair blocks and i-hairs in tinea capitis. Hair blocks are very short hairs with a horizontal distal end. This image shows block hairs in tinea capitis; however, block hairs are a common finding that may be associated with several acquired diseases. i-Hairs (*inset*) are block hairs with an accented dark distal end (×70)

Fig. 2.51 Broom hairs in cicatricial alopecia. We suggest the common term *broom hair* for all abnormalities associated with a few or more linear, short, thin, dark hairs emerging from one follicular opening [13]. Only some of these abnormalities may correspond to trichostasis spinulosa [25], which is usually associated with facial hairs. This picture reveals a few of these follicular units in a female patient with cicatricial alopecia (×70)

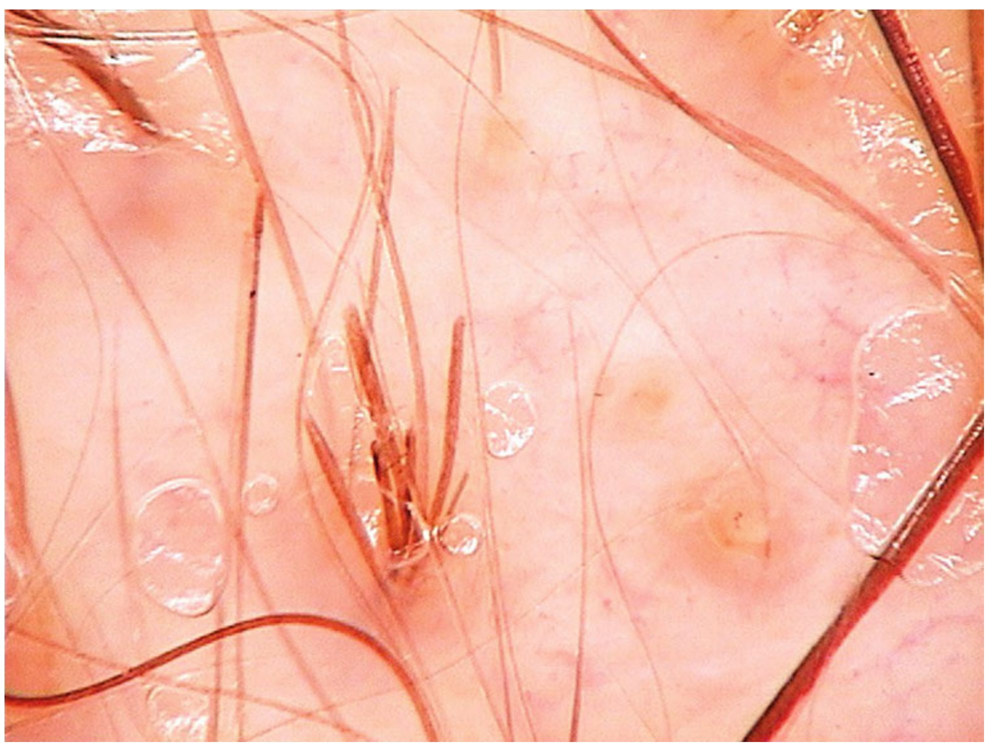

Fig. 2.52 Broom hairs in noncicatricial alopecia. This image shows a different manifestation of broom hairs in a patient with trichotillomania. These are multiple short full-thickness hairs emerging from one follicular unit in a patient who otherwise has long hair (×70)

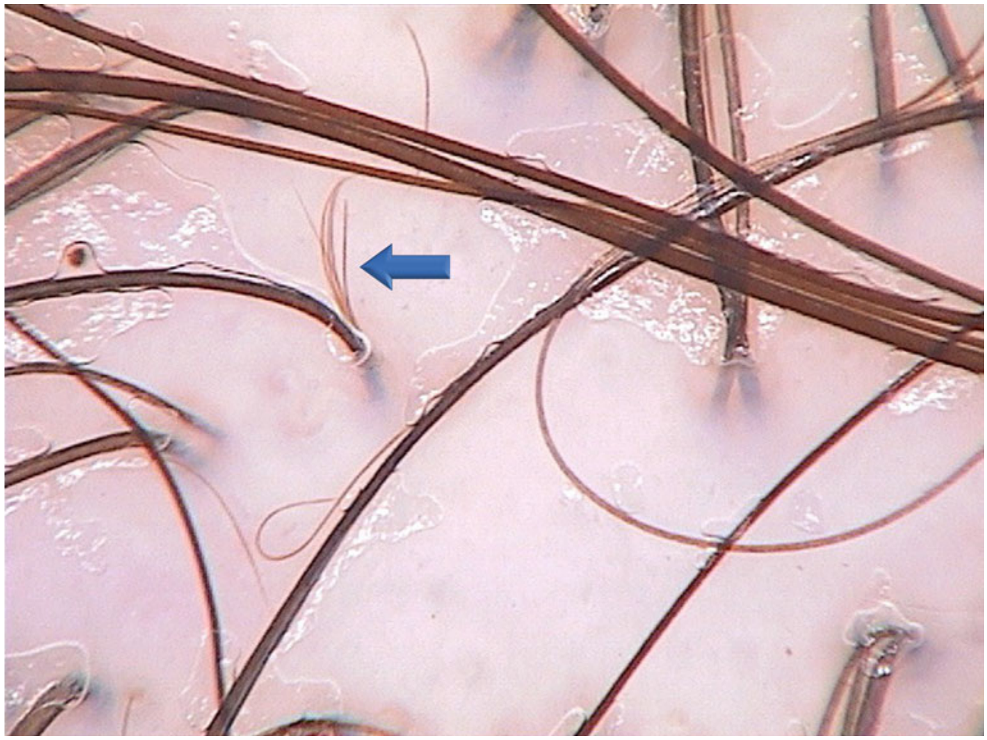

Fig. 2.53 **Broom hairs**. Broom hair–like structures (broom fibers; *arrow*) may be observed in different entities, both cicatricial and noncicatricial. Most likely, they reflect different pathologic mechanisms and histopathologies (×70)

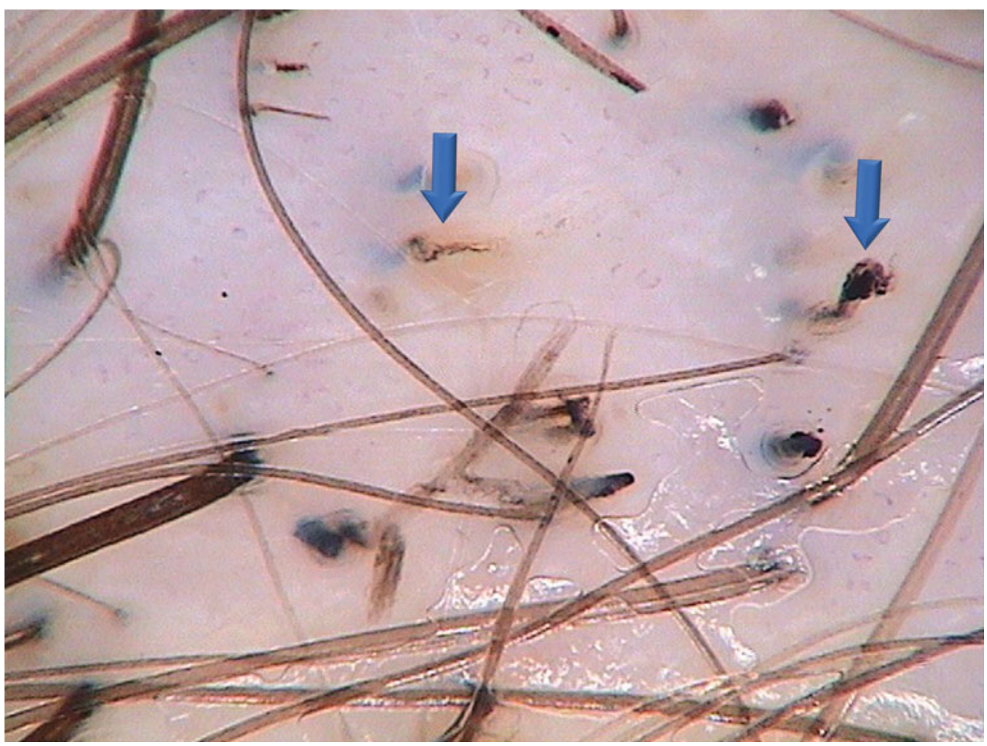

Fig. 2.54 **Flame hairs in trichotillomania**. Flame-like hairs (*arrows*) are residues from recently pulled hairs and are observed most commonly in active trichotillomania [13]. We have not observed flame hairs in other diseases (×70)

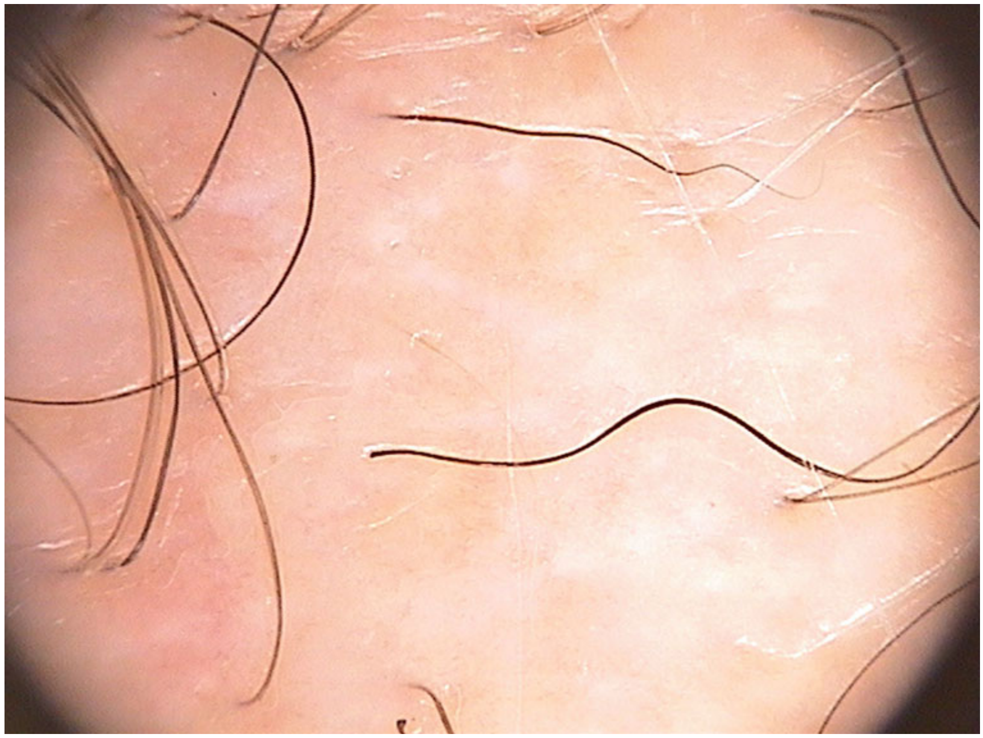

Fig. 2.55 Acquired hair shaft dystrophy in cicatricial alopecia. The most common reason for this condition is perifollicular fibrosis. Before a follicle is completely destroyed, it produces various types of dystrophic hair shafts. They usually emerge in whitish or milky red areas with a decreased number of hair follicles (×20)

Fig. 2.56 Acquired hair shaft dystrophy in cicatricial alopecia. This image shows another example of acquired hair shaft dystrophy in a patient with cicatricial alopecia. The hair is short and very thick compared with other hairs in this patient with dissecting cellulitis (×70)

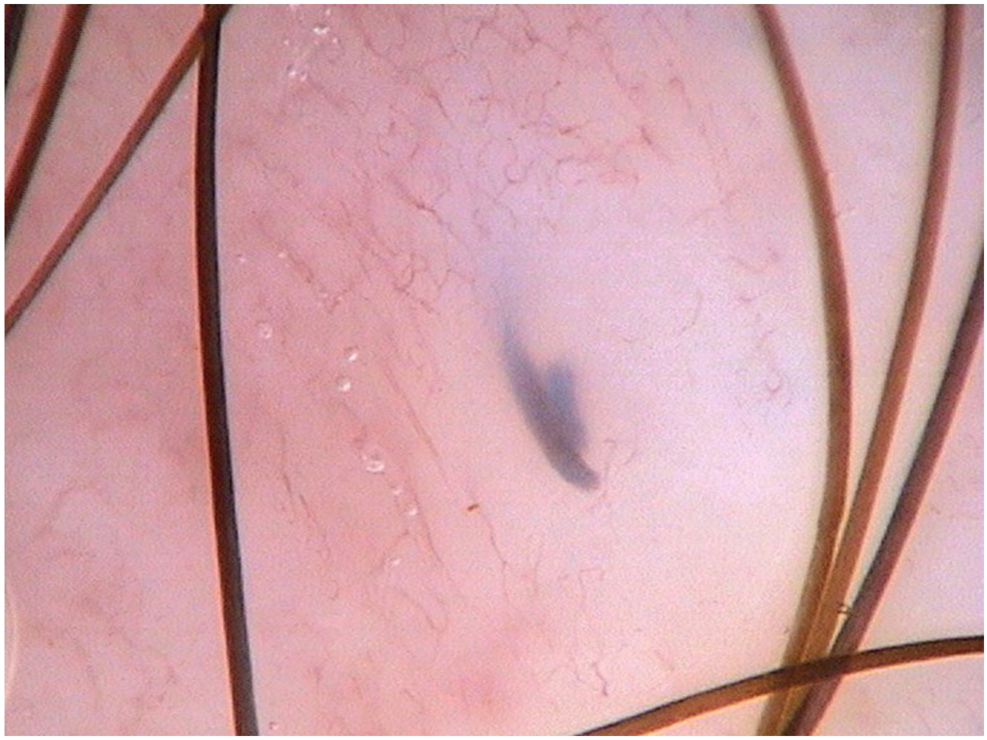

Fig. 2.57 Ingrowing scalp hair in cicatricial alopecia. Dermatologists have evaluated ingrowing scalp hairs much less often than ingrowing eyelashes (trichiasis) [26] and ingrowing facial hairs (pseudofolliculitis barbae) [27]. Trichoscopy allows visualization of ingrowing scalp hairs; they usually are U-shaped and are observed more commonly in cicatricial than noncicatricial alopecia (×70)

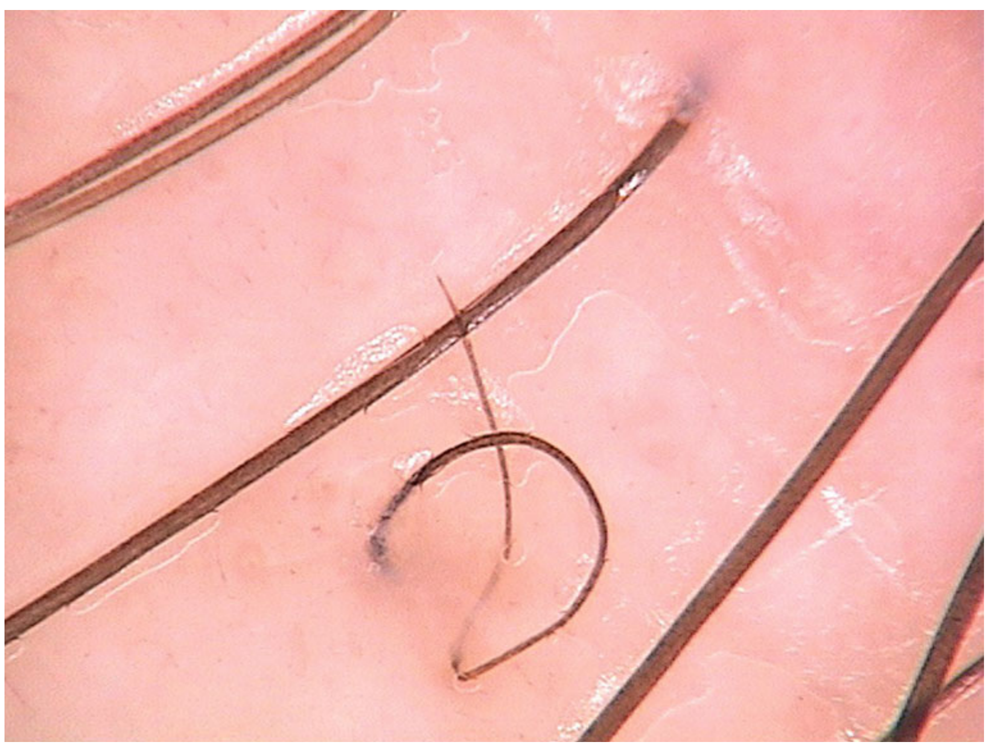

Fig. 2.58 Ingrowing scalp hairs in cicatricial alopecia. The image shows an ingrowing scalp hair curling, then penetrating the epidermis. An inflammatory reaction is visible at the site of the ingrowing hair. This indicates possible subjective discomfort for the patient as a result of ingrowing scalp hairs (×70)

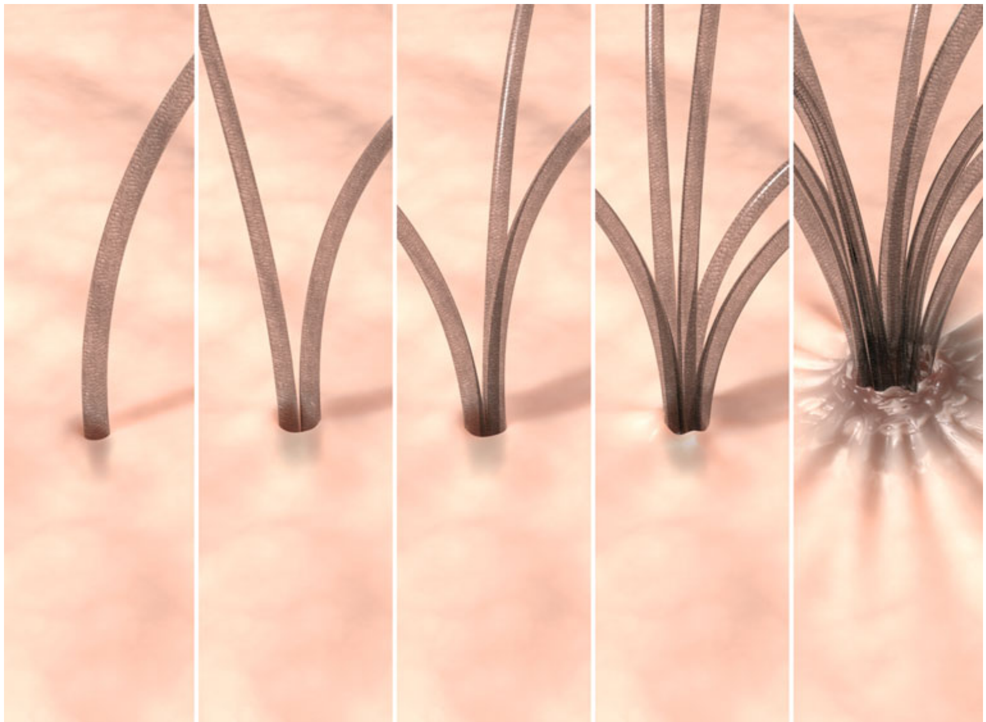

Fig. 2.59 Number of hairs emerging from one follicular unit. Usually, two to three hairs emerge from one follicular unit. Occasionally, four emerging hairs may be found, but this is more common in patients with dark skin phototypes than in Caucasians. The percentage of follicular units with only one emerging hair shaft is usually less than 30 % in healthy individuals. The number of hair shafts emerging from one follicular unit is *decreased* in various types of hair loss, especially telogen effluvium and androgenetic alopecia. The number of hairs in one follicular unit is *increased* in tufted folliculitis. The tufts may be small, with five to seven hairs; small tufts may be observed in inflammatory diseases such as tinea capitis and lichen planopilaris. Large tufts of ten or more hairs are characteristic of folliculitis decalvans; these tufts usually are walled by a wide, hyperkeratotic, scaly hair follicle opening (*Graphic by* Dr. Wawrzyniec Podrzucki)

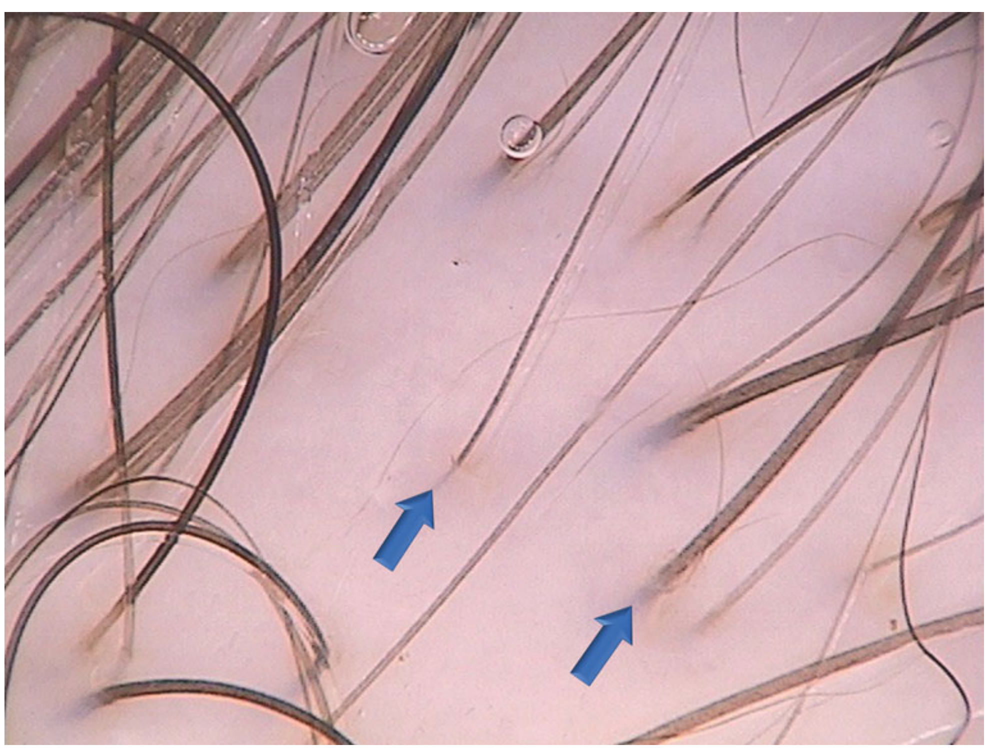

Fig. 2.60 One hair per follicular unit in androgenetic alopecia. In this trichoscopic image of a 42-year-old woman with female androgenetic alopecia, only one hair shaft emerges from most follicular units (single-hair units; *arrows*; ×70)

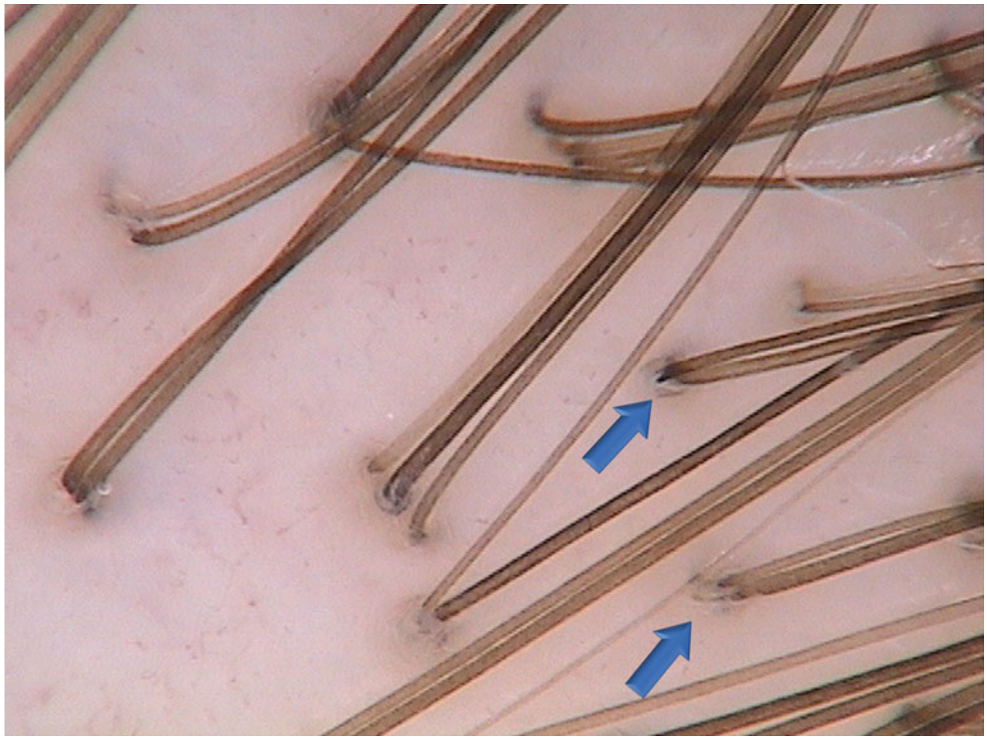

Fig. 2.61 Two hairs per follicular unit in a healthy individual. The number of hairs in a follicular unit varies from one to three in healthy persons. Shown is a trichoscopic image of a healthy person's scalp, in which two hairs emerge from most follicular units (two-hair units; *arrows*; ×70)

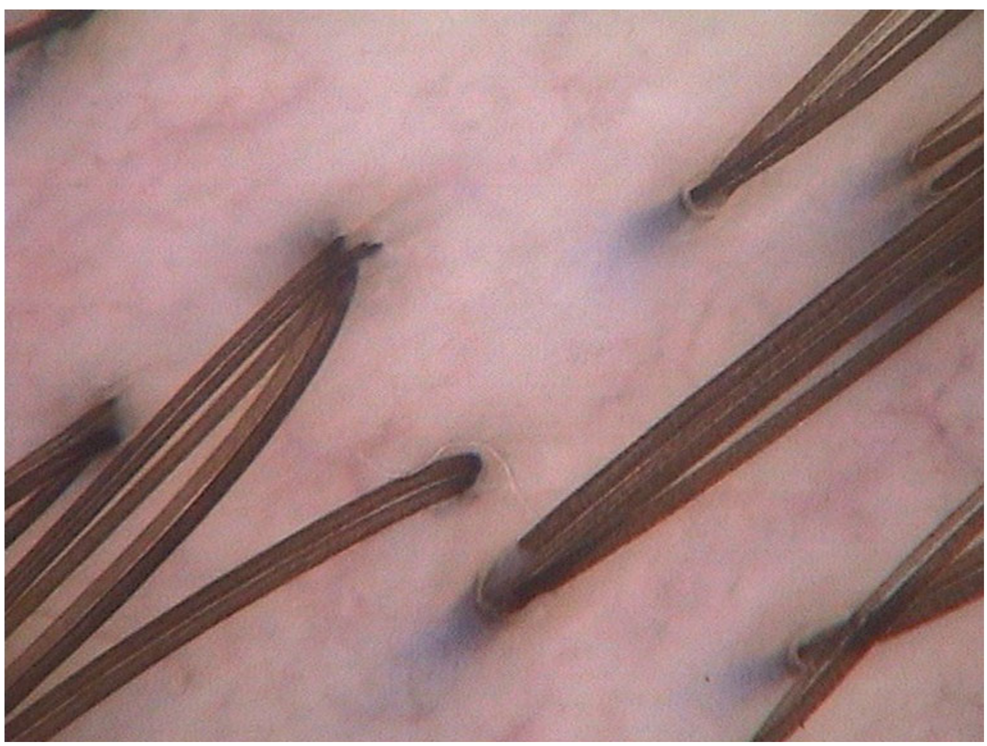

Fig. 2.62 Small hair tufts in lichen planopilaris. In this 56-year-old woman with lichen planopilaris, trichoscopy shows tufts of five to seven hairs. Some authors may consider this number borderline normal (×70)

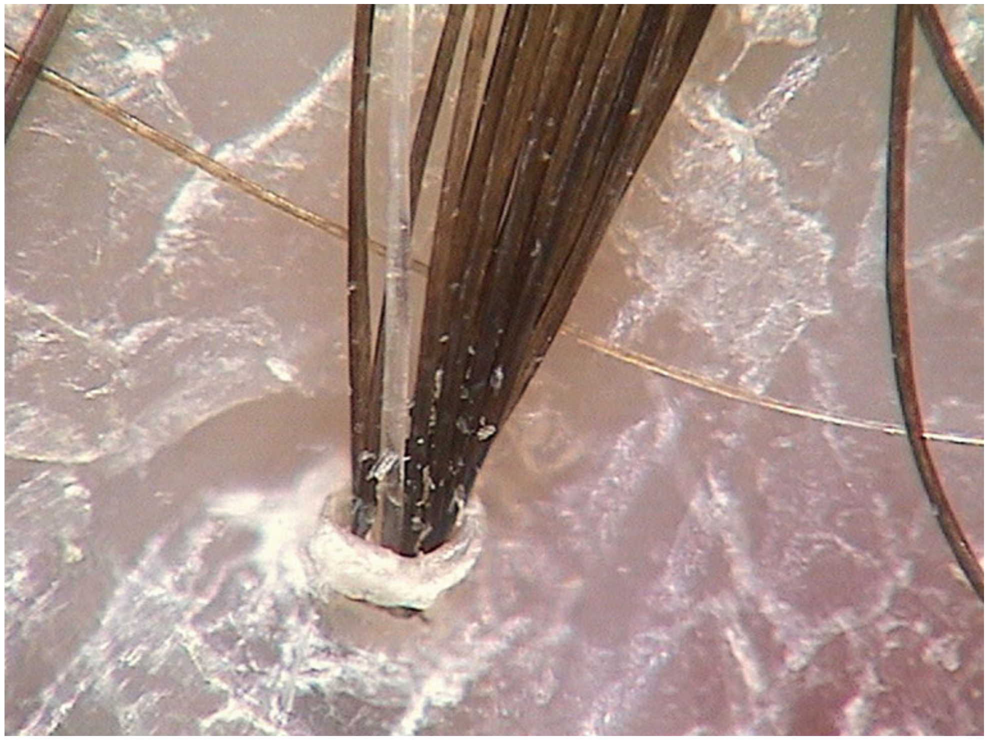

Fig. 2.63 Tufted hairs in folliculitis decalvans. Shown is a tuft containing more than 20 hairs in a 33-year-old man with folliculitis decalvans. The hair tuft is walled by a widened, hyperkeratotic, scaly hair follicle opening. Adjacent to this hair follicle opening is an area of scarring alopecia, with a complete loss of follicles (×70)

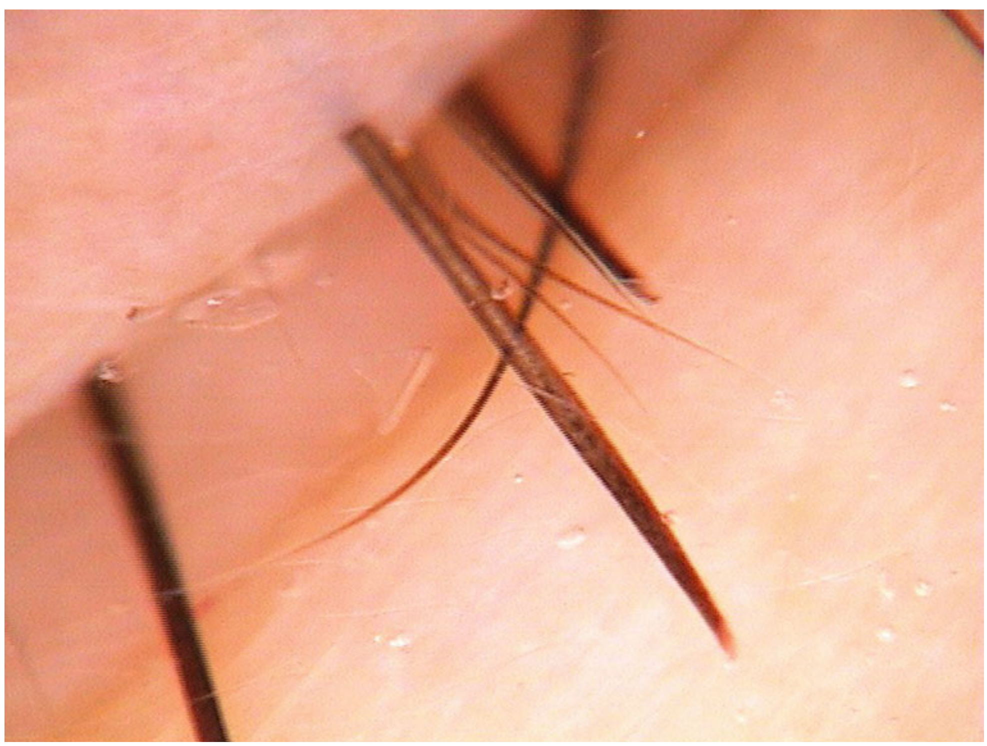

Fig. 2.64 Eyelashes. Eyebrows, eyelashes, and other body hair also may be evaluated with trichoscopy. Abnormalities evaluated trichoscopically thus far are described in the respective chapters. Shown here is a typical trichoscopic image of eyelashes. Trichoscopy was performed with 0.9 % NaCl as an immersion fluid. Special caution must be used in evaluating eyelashes to avoid touching the eye with the dermoscope lens (×70)

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