The issue of kinked tail in Syrian hamster

By Marta Jesariew (Podrik Hamstery, Poland),
Christina Linde (Lindes Hamsteri, Denmark)
and Tomasz Piasecki (Doctor of Veterinary Medicine, Poland)

Our last observations clearly show that among hamster breeders the knowledge about the kinked tail is still too slight. What is the kinked tail and what should one be aware of to reduce the risk of it? What should we be afraid of and what is completely normal?

We tried to put together in this article breeders' experience, hoping that it will bring some clarity to this problem. It is important for us to state that we are not scientists in this field. This article shows our point of view and brings our personal recommendations.

Kinked tail is a well-known deformation that can occur in dark grey lines, in *dgdg* homozygous animals. It can be everything from a small bump on the tail that is not visible but can be felt, up to a very obvious defect (Fig. 1 - Fig. 3). The kinked tail can be found by palpation of the tail; you can feel the 'kink', twist, fold or deformation on the hamster's tail. During the palpation you have to be very careful, because you can damage the tail during the examination if the hamster moves or if you do it too hard.

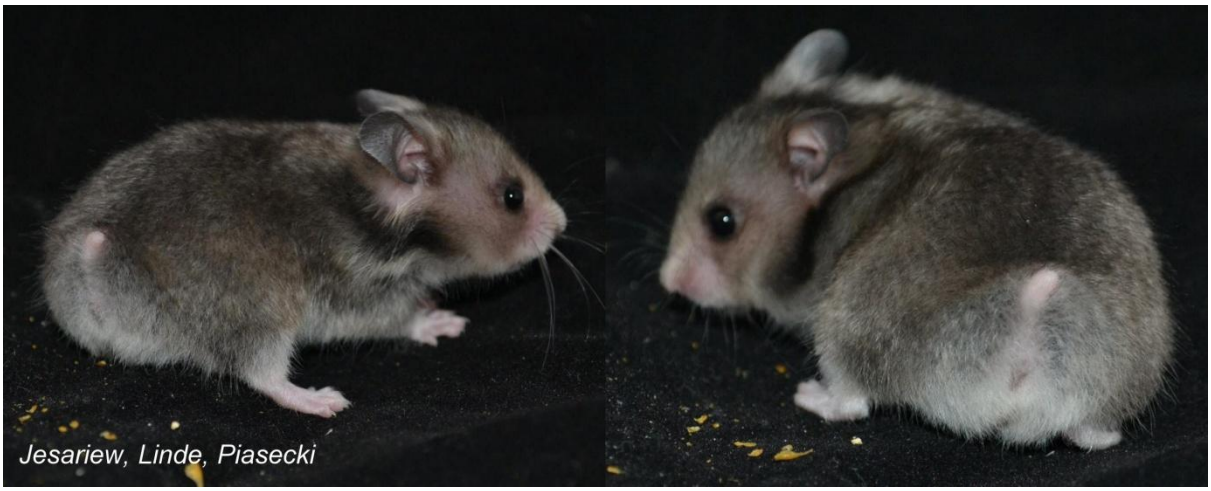

Fig. 1. Picture of kinked-tailed 4-weeks-old hamster (dgdg);
at present 3-months-old hamster, no health issues observed so far

Published online 03-09-2016

Fig. 2. Picture of kinked tail; no health issues, turned almost 2 years before dying naturally.

Fig. 3. Picture of a hard case of kinked tail - spinal deformation. Health issues were observed; hamster suffered from pain, euthanized at age 4 months.

Genetics of kinked tail

Kinked tail seems to be located on the same loci of chromosome as dark grey and it is inherited together with the *dg* gene. We think that a kinked tail is a defect in the gene and could be marked as dg^k. Description $dg^k dg^k$ means: dark grey with the kinked tail.

The dg^k in heterozygous hamsters (*Dgdg*^{k} *or dgdg*^{k}) are free from any sign of the kinked tail and defected gene cannot be detected by widely available methods (it is possible to be detected by genetic markers, but this method is not simple and definitely not cheap). Defected gene can be carried for many generations and can occur unexpectedly during dark grey breeding. Some breeders also consider that strong inbreed can influence appearance of dark grey gene defect.

According to our knowledge that 'ordinary' kinked tail is related only to dark grey gene. Of course - there is always a chance of genetic defects in other colours too (similar to missing limbs, eyes, ears or any hereditary defects), and hamsters born with spinal deformities should never be bred. Tail deformities can also be caused by different reasons; eg. damage of the tail made by mother or other injuries in the nest, 'too little space' in the uterus when we have a highly plural pregnancy, or the most common reason - tail can be broken; especially if the hamster is a great jumper.

First-generation hamsters with kinked tail ($dg^k dg^k$) often do not have any health issues. If the deformity is not severe, the hamster can live a fairly normal life as a pet. We just should not breed hamsters with defects and try to avoid inheriting the defected dg^k gene. A threatened line could be continued only with great knowledge, attention, care and diligence to exclude defected gene. We have to be conscious, that tail is a part of the spine, and further breeding of a hamster with the kinked tail increases the risk of birth of the pups with spinal defects, health problems and high mortality. Probably health problems are connected with the deformations of the spinal cord.

Broken tail - it is not the same!

We have to be conscious that not every curved tail is the kinked one. There are really plenty of hamsters which tail is curved because of accidents. Particularly the most exposed for that are hyperactive pets with high energy - especially jumpers and climbers. If the pet falls down onto its tail it is quite easy to break it. For a period of time the tail is not rigid, but with time it heals and stays permanently crooked. The problem of broken tails is greater than one might think; once in group of 30 hamsters on the hamster show around ¼ of them had got curved tails - some of them even twice.

The simplest method to notice that the tail is broken is regular reviews of your hamsters. When you often do check-ups, you can notice that hamsters which tails used to be straight and rigid - now are discontinuous, and later - permanently bent. Be careful and gentle while doing a check-up; you can break hamster's tail accidentally too.

Is it a kinked tail?

As mentioned most kinked tails are not easy to notice by simple observation. Most of the kinked tails can be found by palpation of the pup's tail; you can feel the hamster's tail is bent. A normal tail is straight with no bumps and kinks. If there is any sort of bumps, that can indicate the kinked tail, it should be taken seriously! During the palpation you have to be very careful, because you can break the tail during the examination if the hamster moves or if you do it too hard.

According to few breeders' experience kinked tail occurs among young hamsters. It should be observed before the hamster turns 2 months. Therefore, it is very important to check the tail of a young dark grey (or other colours based on dark grey) frequently, to be sure not to put dark greys with the kinked tails into further breeding. Being honest to other breeders is very important because of this mutation health.

According to the gained breeders' experience, if the hamster is older than 2 months and has got straight, healthy tail - we should be calm. If any bump on the tail occurs: it is not kinked tail, but simply a broken tail injured by playful or jumping hamster. Of course young hamster also can break its tail during playing, but it is harder to recognise (look at the next section - with X-ray photos - we are trying to check that method) and we recommend that breeders can use the '2-month rule':

- Bump present before 2 months old: expect it could be kinked tail
- Bump present only after 2 months old: expect it could be a normal breakage.

If kinked tail occurs in all or in majority of dark greys in a litter (all dark grey pups are $dg^k dg^k$) all pups should be ruled out from breeding and sold as pets. They still can have healthy and happy life, but the gene should not be forwarded. If kinked tail occurs in only one or a few in a litter also those babies should be ruled out from breeding and sold as pets, but the rest of the dark greys can be used for breeding but the breeder should be extra aware of the possibility of these being $dgdg^k$ and that this can occur in latter generations (we should warn other breeders about it and be very careful).

X-ray method

We decided to check the usefulness of diagnostic methods to recognise and avoid kinked tail problems in hamsters. The question which we set ourselves was: *'is there a chance to distinguish between kinked tail (genetic defect) and broken tail (mechanical trauma)?'*.

Quite simple and relatively accessible method is radiology. We are able to perform X-rays of caudal spine which can reveal the shape and arrangement of subsequent caudal vertebrae. X-ray photos were performed after inhaled anesthesia to catch few seconds of hamster's immobility.

To have a reference we perform X-rays of healthy hamsters - youngster and adult one. We can observe regular equal vertebrae, consisting of the straight caudal spine section (Fig. 4 - Fig. 5).

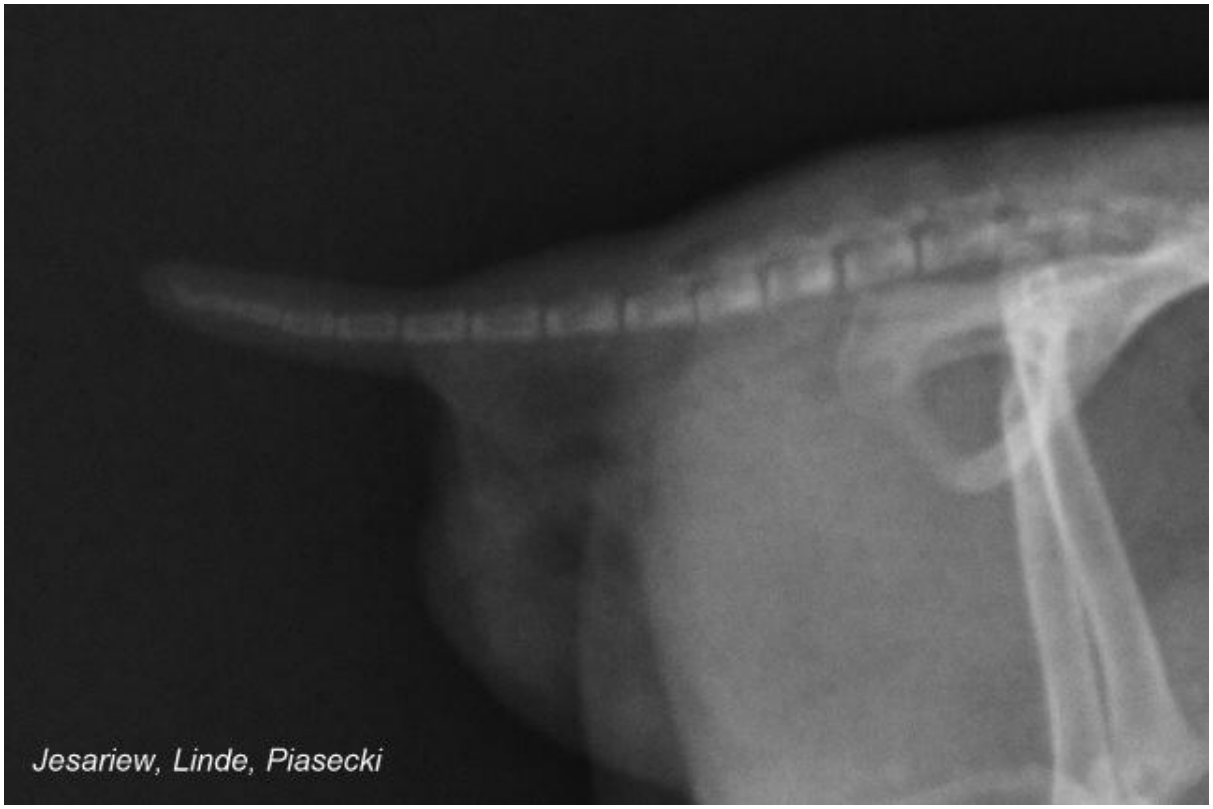

Fig. 4. X-ray of healthy young 3-months-old hamster (dgdg)

Fig. 5. X-ray of healthy adult 1-year-old hamster (Dgdg)

First case is a hamster which tail was broken two times (Fig. 6). Hamster has no dark grey genes in its pedigree, and as a youngster used to have a nice straight tail - until he started to climb and jump very often. Breeder noticed the moment when the tail was broken and movable and the healing process till bone union - in both times. Tail was visibly and permanently curved.

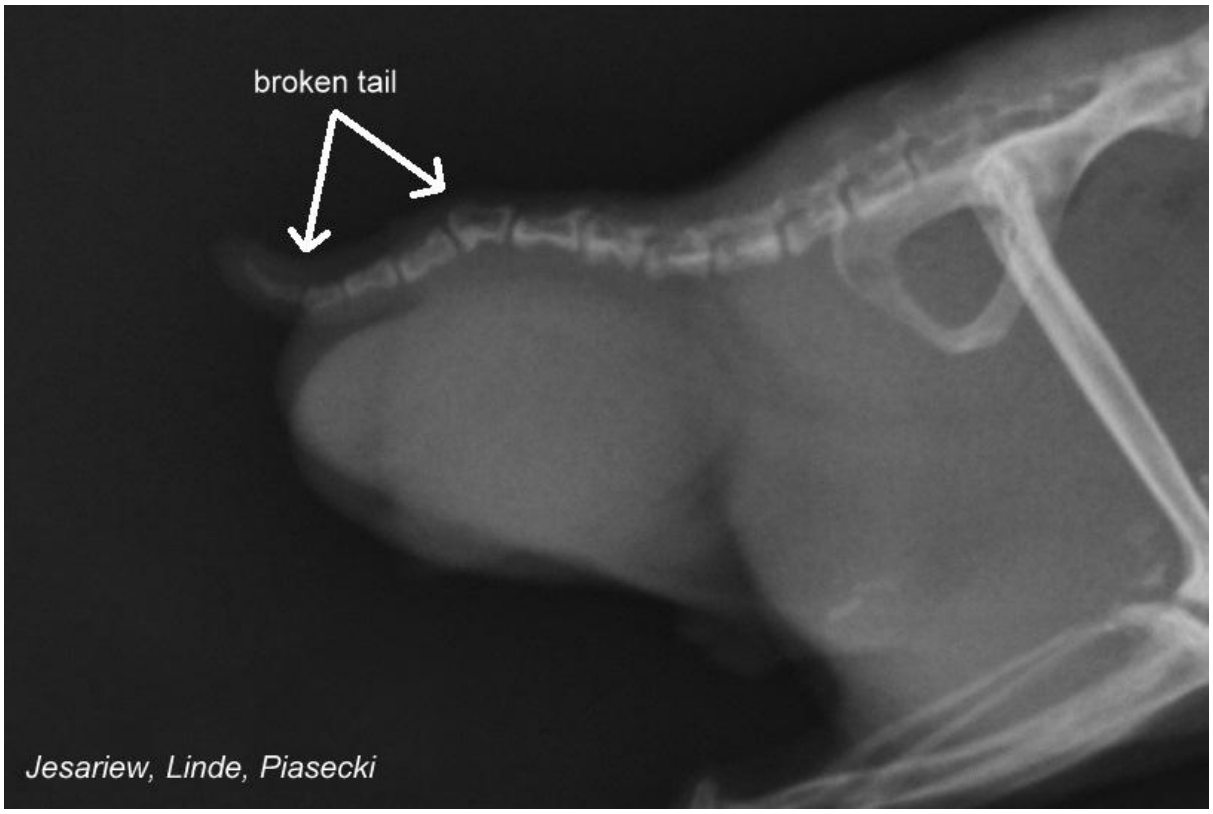

Fig. 6. X-ray of broken-tailed adult 1,5-year-old hamster (DgDg - no dark grey gene); the healing process of broken tail observed by the breeder

Second case is very interesting – it is a Syrian with two tail damages: kinked tail and broken tail (Fig. 7). Hamster is a recessive dark grey gene homozygote. In the X-ray we can see a defected vertebra, which is visibly shorter than other nearby and bent. Defected part develops in a different way than other tail bones, and makes the tail curved. Defect was discovered by palpation in young age.

A bit later this hamster, which is a great jumper too, injured its tail. We think it could be even easier to break during play, because of a bent shape of tail. Also in this case breeder noticed the moment when the tail was broken and changed its shape; the X-ray photo show us a normal size and shape - but tilted last caudal vertebra.

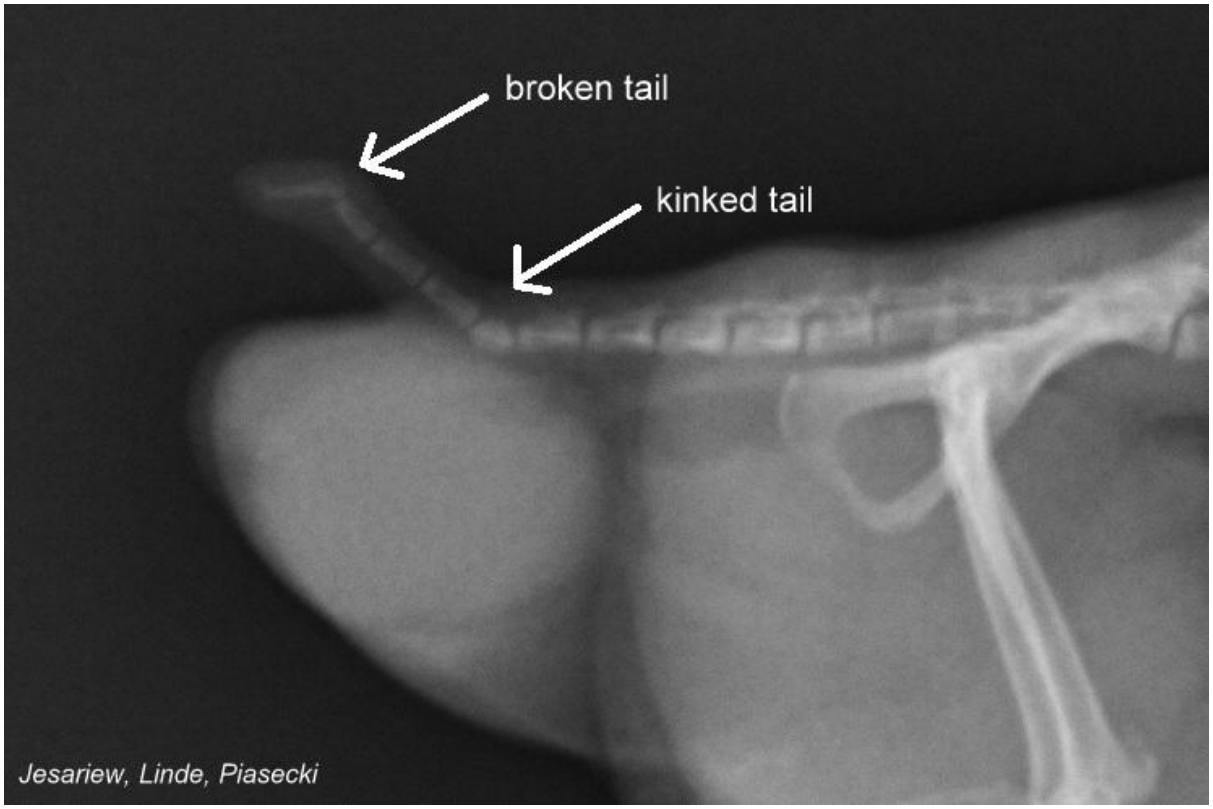

Fig. 7. X-ray of kinked-tailed young 3-months-old hamster (dgdg); the healing process of broken tail observed by the breeder

Third case is a hamster born with tail defect which can be eye-visible at very early age (Fig. 8). We can observe that the tail is very short and tilted. The development of the young was completely normal; the only observed distortions were on caudal section of the spine. With the growing of the hamster and passing of time we are not able to notice any inconveniences due to the occurrence of the defect - it is only 'a beauty disadvantage'.

When the hamster was 11 months old we performed X-rays (Fig. 9 and Fig. 10). We can see defected vertebrae, which are combined in one conglomerate. Intervertebral spaces look fused - probably in the fetal development joints have not been formed. Tail is visibly shorter than ordinary hamsters' tails and bent; defected part makes the tail tilted to the right side. Defect was discovered by visual observation at young age and is very easy to recognize by palpation.

Fig. 8. Picture of kinked-tailed 2-days-old hamster pup (dgdg);
we can observe short and tilted tail

Fig. 9. X-ray of kinked-tailed hamster (dgdg) from previous picture (Fig. 8.) at 11 months old;
we can observe short, tilted tail and conglomerate created by the combined vertebrae

Fig. 10. X-ray of kinked-tailed hamster (dgdg) from previous picture (Fig.8) at 11 months old; we can observe short, tilted tail and conglomerate created by the combined vertebrae

As pets

Hamsters with a minor bump should be able to live like every other hamster and there are no obstacles to sell it as a pet. They are just as good pets as every other Syrian hamster. A hamster with a very deformed tail should be assessed very carefully before selling it as pet, as a few of those hamsters have health issues and die at an early age. In hard cases euthanasia can be the best option.

Ideas for the future

The kinked tail in dark grey hamsters seems to be impossible to breed out, but by careful and considered breeding we could be able to minimize the problem. As recessive mutations do, kinked tail defect can be hidden for many generations and suddenly occur again. If mentioned recommendations are followed, no breeder should be blamed; genetics can be whimsical and dg^k can occur after 20 generations or more…

We believe that anyone breeding with dark grey should avoid major issues and take a responsibility by carefully checking the tails in order to diagnose the kinked tails, share the information about known carriers present in dark grey pedigrees. The additional key is: not to blame attentive and careful breeders if the kinked tail occurs; it is hardly possible to check if the hamster is a kinked tail carrier or not.

We hope that this little article introduces some clarity to the phenomenon of kinked tail and gives advice how to minimize the number of hamsters with kinked tail. We also recommend people who do not breed dark greys to stop worrying about *dg* gene occurring in their lines; it looks that kinked tail is not related to other mutations than dg^k and should not occur in hamsters which are only heterozygous $Dgdg^k$.

Another advice is about honesty; being honest to other breeders is extremely important for this mutation's health! It is also very important to contact with breeders who sold us parents of 'unlucky' litter with kinked-tailed-pups; it also can be helpful information for them in the future.