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Testing for Zinc in Parrot Toys, Play Gyms, and Cages

The Diagnosis of Zinc Toxicity in Pet Birds

Zinc is a metal that is used to plate steel in a process called galvanization, designed to prevent rust. Wire and metal parts are commonly zinc plated (galvanized) and ingestion of even very small amounts of zinc or zinc dust can be very toxic to birds. Unfortunately, parrots are often drawn to metal objects and will play with, suck on, and chew anything within reach, including zinc-coated metal products.

Signs and symptoms of zinc toxicity can be very similar to other illnesses. The bird may feel generally ill and may regurgitate, pass diarrhea, show changes in urate production and/or urination, reduced appetite, and can rapidly lose weight. The birds often become anemic and very weak, sometimes losing the ability to stand, perch or walk. In severe cases, the bird can become week and develop seizures. Other symptoms of more chronic, low-grade toxicity include feather picking, feather color changes, can also occur.

Diagnosis of zinc toxicity is done by a combination of x-rays and blood tests for zinc levels. In some cases the x-rays may show metal present in the bird's digestive tract. Often laboratory values are normal with zinc toxicity, which may lead to an incorrect diagnosis of a "mild infection". Treatment is often with injections, followed later by an oral drug to bind and remove the zinc. This is known as chelation therapy. A laxative may also be used to help remove the metal by flushing the digestive tract. If caught early, treatment is usually successful.

The issue of zinc toxicity is very controversial within the avian community. Some vets feel that the problem is under-diagnosed and there are a significant number of cases of zinc toxicity that are diagnosed as other problems, especially by non-avian vets. On the other hand, other vets feel that there is little evidence that the problem occurs with any significant frequency. This article does not take a stand on this important issue and I feel that this is an appropriate topic for discussion with your avian vet. The focus of this article is to provide information on how to test for zinc in parrot toys if you are concerned with this issue and what to do if you do find zinc coated metal parts on your parrot's toys, play gyms, or cages.

Testing for Zinc in Parrot Toys and Play Gyms

The first question you need to ask yourself is whether or not you even want to deal with the potential problem of zinc coated metal parts. If your bird does not chew on the metal parts of toys, then you don't have a problem even if the toy parts are zinc coated. I am not a fanatic on this issue – my budgie, Billy, does not chew on metal toy parts and I have chosen to leave his play toys and play gyms unchanged, even though I know that many of his toys contain zinc plated parts.

There are many great parrot toys on the market that are either constructed of wood, plastic, and leather parts only or are made entirely with stainless steel. There is a partial list of companies that sell only parrot safe toys at the end of this article, as well as some companies that sell stainless steel components you can use to reduce or eliminate the potential problem. For example, if you have a play gym that has screw eyes to fasten toys, it is very likely that the screw eyes themselves are zinc coated. Rather than go through the potentially dangerous process of testing the screw eyes for zinc, it probably makes much more sense to simply replace the screw eyes with stainless steel screw eyes from one of the companies listed at the end of this article. Another easy to deal with problem is quick links. If you are unsure whether or not the quick links used to fasten the toys to the cage or play gym are safe, you can replace the quick links with stainless steel quick links. This can get fairly pricey however if you have a lot of quick links to replace. Another very easy and very cheap alternative to quick links is to buy inexpensive cable ties from a hardware store. These typically come in bags of 10 to 100 ties and are very inexpensive. The disadvantage is that the ties are not reusable: if you need to move a toy, you will need to cut the tie and replace it with a new one.

One cautionary note on cable ties: many of the larger parrots can easily chew through nylon cable ties and potentially swallow the resulting small pieces. If your bird is a chewer, you should avoid the use of cable ties and stay with stainless steel quick links. In any case, if you do choose to use nylon cable ties, be sure to make sure that the resulting loop is small enough so that it doesn't become a hazard to your bird.

A Note about Parrot Cages

Parrot cages are available in a wide variety of finishes. The most common finishes are chrome, brass, painted metal, powder coated metal, and stainless steel. Stainless steel cages are completely safe, but are substantially more expensive than other options. Many powder coated cages come from major manufacturers and are fairly expensive. It is my understanding that the powder coating used in these cages is zinc free and even if your bird chews the powder coating off the metal, the steel underneath is not zinc plated. That makes powder coated cages a good choice.

When you get a small parrot cage from a pet store, you are much more likely to find cages that are either painted metal, or brass, or chrome plated. Unfortunately, the methods described below cannot be used to test for zinc in either painted or powder coat cages. I am looking into ways to test paint for zinc,

but have not yet determined a simple way to do this. It is worth noting, however, that even if there is a small amount of zinc in the paint; this is not as bad as zinc plated metals which are essentially pure zinc.

Brass is an alloy of copper and zinc. Cages that are brass plated will tarnish over time and since the plating is not too strong, it can easily be chewed off by an aggressive parrot. While the zinc content is lower in a brass plated cage than a zinc plated cage, brass plated cages should be avoided.

Chrome plated cages can either be nickel or zinc plated. As described later in this article, it can be difficult to tell by looking at the plating. If you have a chrome plated cage, I recommend testing it for zinc using the methods described below. I would be especially concerned if the cage is "home made" by a small shop since they are much less likely to be aware of the zinc problem than a large, reputable manufacturer.

Is It Stainless Steel?

Depending on whom you purchased your toys or play gyms from, you may already have safe toys. Testing for stainless steel is very easy. Take a magnet and see if the quick link, screw eye, chain, metal wire, etc. is attracted to the magnet. Stainless steel is not magnetic, so if the metal part does not stick to magnet, the odds are very good that the part is stainless steel and is completely safe for your bird. Note, however, that some lower grades of stainless steel are *slightly* magnetic. They will be attracted to a magnet but not at all like a regular steel part. So far the only parts I have seen which have this property are some metal o-rings I purchased to fix some toys.

One cautionary note however: while I haven't yet seen any toys made with aluminum parts, it is possible that some toys are made with aluminum wire or rings. Aluminum is also not magnetic. I am not aware of any safety problems with aluminum and birds, but since I am not qualified to address this issue, I would suggest either discussing this issue with your avian vet or avoiding aluminum if possible. Stainless steel and aluminum look very different. Typically stainless steel has a fairly bright finish (although not as shiny as some chrome plated metals), while aluminum is usually a dull color. Also, aluminum is very soft. You can easily scratch aluminum with a knife while stainless steel will be very scratch resistant.

Can I Just Ask the Toy or Play Gym Company?

It is my belief that no toy or play gym company wants to put out toys that are dangerous to pet birds. Some of the companies go to great pains to make sure that their toys or play gyms are as safe as possible for birds. Unfortunately, for the most part, parrot toy and play gym making is mostly a cottage industry. Many of the people who make parrot toys are simply not aware of the problem with zinc toxicity. And even if they are aware of the problem, they may not want to use stainless steel parts because they can be difficult to find and they can add significantly to the cost of the toys. Stainless steel is also harder to cut and work with than less expensive metals.

If you are ordering toys from a mail order or Internet company or from a local pet store you should certainly ask if the toys contain any zinc-coated parts. My experience has been that most dealers assume their toys are safe but unless the toys are specifically noted as being made only with stainless steel parts, they have no way of knowing for sure what the toys are actually made of. If you buy toys from a bird fair, you sometimes are buying directly from a local company who makes the toys and you can ask them about how their toys are made. However, in many cases the folks who make the toys simply do not know. If you are buying toys or play gyms directly from the manufacturer, you should directly ask the question about how the toys are constructed. However, as I recently learned even the best-intentioned toy or play gym manufacturer may be unaware that their toys are not completely safe. I recently purchased a beautifully designed wooden play gym from a very reputable manufacturer. Before ordering I specifically asked about the metal parts. I was told that the metal parts were all stainless steel. However, when I received the gym I did the magnet test and quickly discovered that none of the parts were stainless steel. When I called the company to ask about this I learned that the company thought that had been purchasing stainless steel parts for their play gyms. When I explained that the parts were not stainless steel, the play gym company immediately contacted the vendor who supplies their metal parts, including screw eyes, chain, and quick links. The play gym company called me back to indicate that although the parts were not in fact stainless steel, they were nickel plated steel and were completely safe. I then checked all of the metal parts using the method I will describe later in this article. It turned out that the chain and quick links that they were using were in fact nickel-plated steel and were safe. However, the screw eyes used for holding toys were zinc-plated and thus not safe for birds. I then called the company back with my findings. I was very pleased with their response. They apologized for the problem and indicated that they would immediately send me out replacement stainless steel screw eyes for the two play gyms I had purchased from them (which they did). Also, they decided to stop shipping play gyms until they could replace the screw eyes with stainless steel ones. This is the kind of company I like dealing with.

So what can you conclude from this? If a major toy manufacturer indicates that all of their metal parts are safe, there is a reasonably good chance that they are, but you are not guaranteed that this is the case unless all parts are stainless steel (non-magnetic). At the end of this article I will give some guidelines for visually inspecting metal parts that can help you identify at least some unsafe parts.

Testing for Zinc Coating

According to the American Zinc Association, zinc is almost never a component of steel, but rather a coating to prevent rust. Even if steel is partially made from recycled metals that are zinc coating, the re-melting process burns off the zinc. As an impurity, zinc causes steel to become brittle so it is not a component of the steel itself.

The good news is that since zinc is a coating it is relatively easy to test for zinc chemically. The bad news is that the chemical used to test for zinc is hydrochloric acid, which is dangerous stuff to work with. While hydrochloric acid is generally not available to the general public, there is a somewhat diluted form of hydrochloric acid called muriatic acid which is easy to obtain and a little less dangerous to work with.

WARNING: Any handling of muriatic acid for testing for zinc should be done outside in a well-ventilated area. You should be wearing rubber gloves and lab type eye goggles with sides. You should also wear long pants and a long sleeve shirt to minimize the chance of getting any acid on your skin. Also, you should have water readily available so you can quickly wash off any acid that accidentally splashes on your skin or clothing.

If in spite of these warnings you want to test for zinc, here are recommended steps to follow:

1. Muriatic acid can be purchased at most paint stores or hardware stores that have a paint department. Typically the smallest quantity you can purchase will be in a quart bottle. It is not very expensive.
2. You can test for zinc using a single drop of acid, so it is safer to transfer a small amount of the muriatic acid to a small container. I recommend that you obtain a new empty glass medicine bottle with a dropper built in. I was easily able to purchase one for 50 cents at my local pharmacy.
3. Working outside wearing protective gear, transfer a small amount of muriatic acid to the medicine bottle, being careful to not breathe in the fumes. Since the top opening of the medicine bottle is small, you should use a small plastic funnel to pour the acid into the medicine bottle. Do not use a metal funnel unless it is stainless steel – the acid will probably dissolve it. Alternatively, you can pour a small amount of the acid into a glass measuring cup with a pouring spout and then carefully pour it into the medicine bottle. After the transfer is complete, you should close the bottle and wash the outside thoroughly with water (as well as the funnel or measuring cup) to remove any remaining acid. This is actually the most dangerous part of the testing. Once the acid is transferred to the medicine bottle you will only be using a drop or two at a time.
4. To actually test things for zinc, you will need two things: 1) a bucket filled with cold water which you will use to dunk toys and other metal parts to quickly wash off the test acid, and 2) a glass plate or baking dish which is where you will place the item you are testing. (See below for suggestions on how to test cages.)
5. When muriatic acid is put onto a metal part with zinc coating, you will see an immediate and vigorous foaming reaction. The area where the acid touches the zinc will sometimes turn almost black, although this does not always happen. In order to get an idea of what type of reaction you are looking for, I suggest you obtain a galvanized roofing nail from your hardware store, building supply store, or your friendly neighborhood handyperson. Working outside and wearing protective gear put the nail on the glass plate

and put a single drop of acid on the nail. You will get a vigorous chemical reaction. Then try the same thing with something you know is stainless steel, such as a piece of tableware. You will get absolutely no reaction when the item is stainless steel. This will also be the case if the item is nickel plated rather than zinc plated.

6. Use the same procedure to test toys. Note that a toy may have several metal components, for example, chain, quick links, a metal loop fastening chain to a plastic object, a metal wire used to string together wood or plastic parts, etc. As soon as you have tested the metal parts of the toy, immediately dunk the toy in the bucket of water to dilute the acid. You should thoroughly rinse the toy later before using it with your bird.

7. Play gyms usually have metal screw eyes or other metal parts for hanging toys. Remove one of each type of metal part from the play gym and test it for zinc. This includes any nuts or bolts that hold things together. One of my plastic play gyms has metal toy hangers made out of stainless steel, which is great. However, the toy hanger is fastened to the play gym using a regular nut and a wing nut, both of which turned out to be zinc coated!

8. Testing chrome plated cages can be a bit tricky. Since it is not safe to test for zinc indoors, you need to move the cage outside to test it. I have noticed that most cages that are chrome plated are small portable cages, so moving it outside is not a problem. If you have a large parrot cage, you will need to move it outside, which may be a bit of a challenge, especially if the cage won't fit through the door! In any case, once the cage is outside, remove any perches or toys that might be damaged by water. Have a garden hose handy to rinse the cage after testing. All you need to do is put one drop of acid on the cage bars and see if you get the zinc reaction described above. As soon as you do the test, thoroughly hose down the cage to make sure that all of the acid has been rinsed away.

One alternative to testing for zinc yourself that you may want to consider is to see if there is a local commercial analytical lab in your area that can do the testing for you. Another alternative is to check with the toxicology lab at a nearby University. They may charge a small fee for the testing, but at least you won't need to handle dangerous chemicals yourself.

What if You Find Zinc-coated Parts?

If you test a number of toys and play gym parts, it is very likely that some of these parts will be zinc plated. Your bird may not chew on the particular metal parts, for example, a quick link or a small exposed wire, in which case there is probably no reason to replace the toy or part. However, if you have a metal chewer like I do, you will need to take some action to protect your bird. Here are some suggestions:

1. If your bird shows any of the signs and symptoms listed earlier in this article, then you should consult your avian vet for advice about possible testing for zinc toxicity.

2. Contact the toy manufacturer or company you purchased the toy from to see if you can return it or exchange it for a safe toy. If you have a play gym

with metal parts, ask them to send you stainless steel parts to replace the unsafe parts.

3. In many cases it is possible to modify or rebuild the toy to make it safe. At the end of this article are some places where you can purchase stainless steel parts, including quick links, screw eyes, metal loops, chain, and wire. Components like screw eyes and quick links are generally easy to replace. In some cases you may be able to figure out a way to "hide" the non-safe part. For example, one of my bird's favorite toys is a coiled rope-covered hanging toy ("Boing") that contains an unsafe metal wire core. All of the wire is completely covered, however, except for a small section at the top that is connected to a quick link to hang it. Naturally, this was the part of the toy that Scooter prefers to chew on. I made a small extension loop out of stainless steel wire and used a hollow wooden toy part to cover the exposed metal. The stainless steel wire loop fastens to the unsafe metal wire, goes through the wooden toy part, and has a loop at the top that is used to hang the toy using a stainless steel quick link. I have also replaced the wire in several toys with stainless steel wire, metal loops with stainless steel loops, etc. Be creative – you can often figure out a way to modify or rebuild many toys or at least use the safe wooden or plastic parts to make new toys.

4. Stainless steel is much harder than normal zinc-coated steel. You will need heavy-duty wire cutters to cut through stainless steel wire and long nose pliers to bend it. Also note that even though the wire used to string together a toy may be larger in diameter, you should probably not use stainless steel wire thicker than 1/16" because it will be very hard to cut and bend. Stainless steel chain can be cut with a hacksaw or with a heavy-duty bolt cutter. Make sure you wear safety goggles when you cut or bend stainless steel parts.

Visually Inspecting Toy Parts

Having tested a great number of metal toy parts and play gym components, I can give you some guidelines as to what to look for if you do not want to go through the testing process.

- Any metal parts that are not shiny are probably zinc-plated steel. For example, many perches have large washers at one end that are used to fasten the perch to the bars of the cage. Generally these washers are zinc-plated. On some of the perches you can easily replace the washers with stainless steel washers to make the perch safe. However, the cholla wood perches mostly seem to have one of the washers glued to the wood, which makes replacing the washer difficult to do.
- If the toy contains a wire core used to string wooden or plastic parts, the wire itself is probably zinc-plated. Wire is also sometimes used to fasten parts of the toy together. If the wire is magnetic, it is almost certainly zinc-plated.
- Screw eyes on play gyms are likely to be zinc-plated. You can easily use a magnet to see if they are stainless steel.

- Metal chain is a mixed bag. Some chain is nickel-plated and is safe. Other chain is zinc-plated and is not safe. You generally cannot tell the difference unless you test it.
- Quick links are also a mixed bag. Some are nickel-plated and safe; others are zinc-plated and unsafe. You need to check for zinc or replace them with stainless steel quick links.
- The brass used to make brass-plated steel is made up of copper and zinc. Depending on the proportions of copper and zinc the platings can potentially be toxic. I have tested some samples of brass-plated steel and gotten no zinc reaction indicating that they are probably safe, but it is probably not a good idea to assume that all brass-plated steel is safe. With pure brass, the zinc and copper are tightly bound so it would be necessary to ingest a piece of a brass object to get a significant amount of zinc into the system. I would recommend avoiding brass if possible.

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