Masking devices and alprazolam treatment for tinnitus

Jack A. Vernon, PhD*, Mary B. Meikle, PhD

Oregon Hearing Research Center, Department of Otolaryngology, Oregon Health & Science University, Portland, OR 97239–3098, USA

Clinician A: “Why would anyone be writing about ‘treatment for tinnitus’ when we all know that nothing can be done for it?”

Clinician B: “I think you’ll be pleased to hear there are now a number of treatments that are available for tinnitus, and some of them have provided relief for substantial numbers of patients over the past 20 years!”

Before discussing treatment methods, it may be helpful to review some general guidelines that have emerged from the authors’ clinical practice and from hearing what patients tell them about visits to other clinics. The following guidelines seem important to the authors because so many tinnitus patients have met with indifference, lack of understanding, and even dismissal from a number of practitioners. The following techniques can help greatly in establishing a constructive treatment relationship:

1. Express sympathy and care: Many patients have visited a wide variety of health professionals seeking help for their tinnitus. You may well be the first who is knowledgeable about tinnitus and truly concerned about such problems. Tinnitus patients may see you as their last avenue of hope. Whatever you do, you must not leave any patient with no hope at all. Never tell patients “There is nothing I can do,” or “You must learn to live with it.” Because of the rapidly increasing pace of tinnitus research, there will always be new things to try. It is your job to convince patients that, even if current techniques fail them, tinnitus research is daily making advances that may one day help them.
2. Establish your interview as a dialog: One does not simply “see” patients; a truly effective tinnitus clinician interacts with patients in several important ways. First, find out what sorts of situations are most troubling to the patient in question. Individuals differ greatly in how tinnitus affects their life, and you need to know the specific nature of their difficulties to select appropriate treatments. Second, encourage patients to ask questions, and to the best of your ability, answer those questions honestly and completely. Third, be forthright in admitting incomplete knowledge when such exists.

3. Develop a relaxed yet attentive interview format: Arrange the seating so that it promotes easy interaction; do not distance yourself or create unnecessary barriers. Also, think about whether wearing a white coat helps or hurts your effort to draw patients out and put them at ease. The authors find it is often very helpful to have tinnitus patients bring their spouses or another significant friend or family member to attend the session.

4. Use an interviewing approach that allows you to give your undivided attention to the patient: Your main opportunity to learn about tinnitus comes from your patients, so be prepared to accept this information and to profit from it. Provide adequate time for a thorough interview, allowing ample opportunities for patients to comment or to ask questions. With elderly patients or with those who are extremely distressed, the interview may be quite lengthy. Nevertheless, the time spent in interviewing patients is an essential part of developing effective treatment insights and is very valuable.

5. Provide clear explanations of all of your procedures, in layman’s language: Avoid “talking down” to patients, but at the same time, try to provide understandable explanations of what you have concluded from your diagnostic work-up, and what you propose to do about it. In presenting the options for therapy the effective tinnitus clinician carefully explains the nature of the therapy. It is important to indicate both positive and negative aspects, using the language of the layman but being careful to avoid any tone of condescension.

6. Remember the importance of quality of life: Tinnitus patients often have a variety of problems brought on by their tinnitus, such as family difficulties, the need to alter a noisy work environment, or fears that their tinnitus is a sign of impending deafness or brain disorder and that the tinnitus may become even worse. The most effective tinnitus clinicians develop a broad concern about all aspects of the patient’s problems, and help the patient deal appropriately with each.

Fortunately, as Clinician B commented above, there are today many helpful approaches to tinnitus treatment. In fact there is a large literature concerned with the various types of treatment, as can be seen from several recent reviews [1,2]. The present discussion focuses on two: tinnitus masking and use of the benzodiazepine alprazolam.
Masking of tinnitus

Masking of tinnitus is somewhat like fighting fire with fire. One often hears tinnitus patients saying something like, “What is the value of adding yet another sound in the ear when I already hear too much sound because of my tinnitus?” The answer to this statement is: tinnitus masking is valuable because it provides relief. From early times it has been known that appropriate types of external sounds can cause tinnitus to become diminished or even inaudible [3]. Wearable masking devices were first instituted in the 1970s [4,5], resulting in extensive clinical work with tinnitus masking since that time [6–8].

At the Tinnitus Clinic of the Oregon Health & Science University, after reviewing thousands of patient records, it can be stated that tinnitus is maskable in 95% of tinnitus patients, when tested in the clinic using masking noise generated by specialized test equipment (Table 1). Not all of those who experience masking find that their tinnitus is completely masked. As Table 1 shows, about 92% of the clinic patients experience complete masking (defined as elimination of the tinnitus sensation), whereas about 4.5% report partial masking. When tested in the authors’ clinic with wearable masking devices (which are not as effective as the tinnitus synthesizer), the percentage of patients whose tinnitus is masked drops slightly, to about 90% of patients, 70% of whom are completely masked.

Throughout the past 25 years there has been extensive development of equipment and methods for masking tinnitus, with the result that there is now a large literature dealing with the phenomenon of tinnitus masking [7].

Table 1

Percentage of patients experiencing masking of their tinnitus using various types of masking sound generators

<table>
<thead>
<tr>
<th>Extent of masking</th>
<th>Percentage of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masking by synthesizer*</td>
<td></td>
</tr>
<tr>
<td>Complete masking†</td>
<td>92</td>
</tr>
<tr>
<td>Partial masking‡</td>
<td>4.5</td>
</tr>
<tr>
<td>No masking achieved§</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Masking by wearable devices†</td>
<td></td>
</tr>
<tr>
<td>Complete masking†</td>
<td>70.5</td>
</tr>
<tr>
<td>Partial masking‡</td>
<td>19.6</td>
</tr>
<tr>
<td>No masking achieved§</td>
<td>9.9</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

†Tinnitus not audible.
‡Tinnitus diminished but still audible.
§Tinnitus unchanged in the presence of masking sound.

*Patients were tested using synthesizer-generated noiseband from 2000–12,000 Hz.
†Patients were tested using individually fitted choice of tinnitus masker, combination unit, or hearing aid for one or both ears.

Data are from a representative sample of 1395 consecutive patients tested at the Tinnitus Clinic, Oregon Health and Science University.
Most important, there are now literally thousands of individuals with severe tinnitus who have received substantial relief from tinnitus masking techniques [7–10].

**Types of wearable tinnitus maskers**

There are three different types of wearable devices that can be used, depending on the patient’s hearing loss and the nature of the tinnitus in question:

1. Hearing aids produce masking of tinnitus by amplifying ambient noise which, in turn, may cover or mask the tinnitus.
2. Tinnitus maskers generate noise bands, preferably with user-adjustable frequency emphasis, to permit the user to select the optimum noiseband for achieving “coverage” or masking of the tinnitus at the lowest possible sound level.
3. Tinnitus instruments are combination devices, containing both a high-frequency hearing aid and a tinnitus masker within the same case; it is essential that the hearing aid portion and the masker portion have independent volume controls; again, user-selectable frequency bands are important for adequate control of the masking noise.

All of these devices are now greatly improved through the use of digital processing. Present day technology using digital circuitry has made it possible to customize these various masking devices to fit each patient’s needs more exactly.

**Frequency range of patients’ hearing loss dictates choice of masking devices**

Clinicians should be aware that effective tinnitus maskers and tinnitus instruments are designed with the specific goal of providing high-frequency emphasis as needed. There are several reasons. First, high-frequency hearing losses are the most common audiometric configuration in the tinnitus patient population [11,12]. Second, most tinnitus is high-pitched; when patients were tested using a tinnitus synthesizer, which is capable of generating a wide range of pure tones, the frequencies matching the pitch of tinnitus ranged from 100 to 16,000 Hz (median 6000 Hz) [12,13]. Third, many (although not all) patients with high-pitched tinnitus require high-frequency noise to mask their tinnitus. Tinnitus instruments were developed because patients with high-frequency hearing loss cannot receive adequate benefit from the high-frequency masking sounds they need unless amplification is provided for sounds in that frequency region [6].

By comparing the pitch-matching data with audiograms obtained in the same patients the authors have learned that there is a highly significant inverse relationship between the pitch of tinnitus and the amount of hearing loss: patients with the greatest amount of hearing loss often have the lowest-pitched tinnitus, whereas those with normal or nearly normal hearing generally have
very high-pitched tinnitus [14,15]. Taken together, these findings lead to the following guidelines for the design and fitting of masking devices:

1. Patients with normal hearing probably have very high-pitched tinnitus, and should receive tinnitus maskers that generate masking bands with substantial high-frequency content (6 kHz and above).

2. Patients with both high-pitched tinnitus and high-frequency hearing loss (above 3 to 4 kHz) probably need tinnitus instruments to provide adequate masking together with the necessary amplification in the higher frequencies. (Note that hearing aids alone do not usually provide adequate masking for patients with high-pitched tinnitus because ambient noise does not ordinarily contain much energy above 4 kHz and cannot supply suitable masking sound for such individuals.)

3. Patients with substantial hearing loss in the lower frequencies (below about 3 kHz) or who have flat hearing losses probably have lower-pitched tinnitus. Such patients usually need lower-frequency masking sounds (4 kHz and below) and for such patients, well-fitted hearing aids are likely to provide adequate masking simply by amplifying ambient environmental noise.

4. For most tinnitus patients who display some form of hearing loss it is probably a good idea first to determine whether or not properly fitted hearing aids not only correct the hearing loss but also effectively relieve the tinnitus. Occasionally even high-pitched tinnitus can be masked effectively with a hearing aid.

Despite this, it is of paramount importance that a clinician not prejudge the patient’s therapy. Instead, effective masking therapy requires that the clinician present the various possibilities for the patient to evaluate, allowing the patient to determine which type of device works best for them. For patients with bilateral tinnitus, it cannot be assumed that both ears require the same type of device. For example, the authors have worked with many patients who need a hearing aid to mask one ear and a tinnitus instrument to mask the other; or who require a masker for one ear and a tinnitus instrument in the other.

**Effectiveness of the various types of masking devices**

Some time ago the authors reviewed a large group of tinnitus patients who had been successfully using some form of masking for at least 2 years [16]. In that sample 95 (16%) were using hearing aids alone effectively to mask their tinnitus; 124 (21%) were using tinnitus maskers; and 373 (63%) were using tinnitus instruments. In keeping with the guidelines for fitting masking devices cited in the preceding section, a review of the clinic records for these patients revealed that those using hearing aids to mask their tinnitus had fairly low-pitched tinnitus, in general below about 4000 Hz, and also had hearing losses in the pitch region of their tinnitus. Those using tinnitus maskers had little or no hearing loss together with relatively
high-pitched tinnitus, whereas those using tinnitus instruments had both high-pitched tinnitus and high-frequency hearing losses.

In addition to choosing the appropriate types of devices for various patients, and the necessity for ensuring that appropriate frequency ranges for the masking bands are selected, there are a number of important procedures concerning the correct setting and use of masking devices. Failure to ensure that patients are familiar with these procedures has undoubtedly resulted in masking failures that could have been avoided. The next section provides several usage guidelines that are necessary to ensure effective use of tinnitus masking.

**Guidelines for effective use of tinnitus masking devices**

During the fitting of masking devices, and throughout their use, it is essential for the two different portions of the tinnitus instrument to be adjusted separately, with the hearing aid portion of the instrument adjusted first. After determining the optimal setting of the volume control for the hearing aid so as to establish a comfortable listening level, users should then “add in” the tinnitus masking sound very gradually, adjusting the masking level in small increments just until their tinnitus is no longer audible. The clinician should make such adjustments for the patient the first time the devices are tried, to demonstrate how very small adjustments can produce large differences in the masking effects. The aim is always to establish a masking level that patients find more acceptable than their tinnitus. If the patient finds that the masking sound must be raised to an uncomfortable level to cover or diminish the tinnitus, then that patient is not a candidate for masking, and some other form of tinnitus treatment must be tried.

It is always important to adjust a tinnitus masker or tinnitus instrument so as to generate the lowest level of masking sound that is capable of masking or relieving the tinnitus. Users also need to be aware that, from time to time, they may need or wish to adjust the tinnitus masking level slightly. The objective always is to use sound levels that are more acceptable than the tinnitus, which typically means that the masking sound levels are not perceived as being loud. It is often quite surprising, both to patients and to clinicians, that it is usually easy to achieve effective tinnitus masking at sound levels that are not very loud.

For the 20% or so of patients who do not experience complete masking, the clinician should reassure them that complete covering-up or masking of the tinnitus is not absolutely essential, because substantial relief can often be achieved by partial masking (reducing the tinnitus to a lower but acceptable loudness level). Again, for effective treatment of tinnitus in such cases, the loudness level of the masking sound must never be so loud as to be less acceptable than the patient’s tinnitus.

If the patient’s tinnitus is disruptive to sleep it is a good idea to use in-the-ear fitting for either tinnitus maskers or tinnitus instruments, so that the
masking unit might be worn all night long. There are also masking pillows and other types of devices, such as bedside maskers, that have become widely available (Note 1).

Tinnitus clinics that wish to offer masking as an effective relief procedure for tinnitus must be able to demonstrate the various masking devices to patients, and evaluate their effectiveness for that patient during the patient’s initial visit to the clinic. To provide an adequate demonstration of tinnitus masking it is necessary to have on hand a variety of hearing aids, tinnitus maskers, and tinnitus instruments.

Tinnitus masking using recorded sound

Another and effective form of masking is provided by compact digital disks (CDs) that have recently become commercially available. These have replaced the custom-made masking tapes that the authors used to recommend for patients who could be masked by the tinnitus synthesizer but not by the smaller, wearable devices [6]. Among the currently available CDs, one especially effective offering provides music in the foreground with the masking noise in the background (Note 2). As a change from conventional masking this is a most acceptable and pleasant approach to masking. The music seems to be enjoyed by most patients and the masking noise in the background seems to be highly effective. There is another source for masking CDs, which provides a variety of recorded noise in the form of seven different noisebands, each with different frequency range so that users can try them all and determine which does the best job of covering their tinnitus (Note 3).

Both types of CDs can be used in several different ways. During the day a portable CD player that fits in a coat pocket and uses a headset makes it possible for the user to go out and about with this form of masking. (Although this approach may make users look like members of the “rock” generation, nevertheless a number of senior tinnitus patients have found this form of masking very acceptable.) The other form of using the CDs is to arrange the CD player so that the masking sound is quietly broadcast into the listener’s environment (such as the bedroom during sleep, or a private work area during the day). Users are able to set up a “relief zone” in which they are not aware of their tinnitus. A large number of patients have reported this to be a satisfactory and effective solution for their tinnitus-related sleeping difficulties.

Tinnitus masking using bone-conduction of ultrasound

Very recently a new wearable device has been developed that uses high-frequency bone conduction to conduct masking sounds into the head, without the need for occluding the ear canals [17]. The device has been approved by the Food and Drug Administration as a tinnitus masker and is termed the HiSonic Tinnitus Relief Device (Note 4). Preliminary reports
indicate favorable reactions from a small number of patients who have used the device for obtaining tinnitus relief. In addition, the evidence available to date suggests its use may provide more extended periods of residual inhibition (temporary suppression of tinnitus after the masking sound is turned off) than those that typically occur with masking in the normal range of audible sound.

Tinnitus masking in patients with a cochlear implant

It is well established that patients with tinnitus and profound hearing loss, who then have a cochlear implant in the tinnitus ear, frequently experience complete tinnitus relief following the implant surgery [18,19]. There always remains a certain percentage, however, who do not obtain tinnitus relief postsurgically. Recently, one such patient, who lives in Israel wrote to ask whether there was anything the authors could suggest that might help him with his very troublesome tinnitus. Although the authors have never seen this individual, and all interactions have been by either mail or telephone, together they have achieved some very interesting masking results as shown next.

For some time the authors had been interested in the possibility that the cochlear implant might be able to function as a vehicle for providing tinnitus masking to patients with profound hearing loss and tinnitus who cannot benefit from the usual types of devices, such as hearing aids or tinnitus maskers. They wrote to the patient in Israel to see whether he would be willing to try to mask his tinnitus using the implant. It was explained that to their knowledge such a procedure had not been attempted previously, and that they could not predict whether the method would work to provide relief for his tinnitus.

The patient expressed interest in trying masking through his implant, and asked how he should proceed. The authors responded by sending him a masking CD with the instruction to play each of the seven different bands of masking noise while listening to them using the input microphone to his cochlear implant. They reasoned that, because he had received a 22-channel cochlear implant, the frequency resolution provided by the various different implant channels might make it possible to differentiate between the different noise bands. It was hoped that some of the different masking bands might prove to be audible to him, and that one or more of the bands might mask his tinnitus.

Several weeks later he wrote back to say that band number five (6000 through 14,000 Hz) completely masked his tinnitus and did so at the lowest sound level of any of the masking bands. The authors recommended that he use that masking band any time that he felt a need for tinnitus relief. He has continued to correspond with the authors, reporting that his use of the masking sounds through his cochlear implant continues to provide considerable relief. Interestingly enough, he has never experienced residual
inhibition from this use of masking. This patient is a particularly interesting case because he was a proficient violinist before he became deaf (which happened as a result of prolonged dehydration and heat exhaustion in the desert). As a result of his musical training he is a knowledgeable observer and an excellent reporter about his own auditory sensations.

A surprising feature of his auditory experience is that whenever the masking sound is turned on, both speech and music become much more clear. He notes so much improvement in his auditory perception that he can once again play his violin! (He commented that although his playing was not exactly in tune, other musicians told him that it was quite close to being in tune. He had not been able to achieve that degree of pitch awareness until he began listening to the masking sound while playing.) This patient was so pleased with his cochlear implant that he has had his other ear implanted. He now obtains similar masking results in the other ear; the masking delivered through the implant completely relieves the tinnitus on that side and also improves the clarity of music and speech perceived by that ear.

All in all, this patient represents a unique success story for tinnitus masking, one that could not have been anticipated beforehand. His observations have led the authors to suggest that the deliberate introduction of noise into cochlear implants (possibly with a selection of different noise bands) might be a technique that could be helpful to others [20]. It is possible that masking-induced improvements in this patient’s perception of speech and music could be accounted for by some type of stochastic resonance phenomenon [21,22]. Although it is hazardous to base conclusions on a single case, it seems that his experiences with masking through the cochlear implant offers useful insights that deserve further investigation in a larger group of cochlear implant patients.

Use of masking for pulsatile tinnitus

It is not uncommon for some tinnitus patients to have a fluctuating type of tinnitus that is in phase with their pulse, and which may or may not resemble heart sounds. In some cases, the sound may be very high pitched even though it has a pulsatile nature. Pulsatile tinnitus is a special case in that it is not a phantom sound, such as the more common subjective forms of tinnitus; rather, it is an actual physical sound that is being generated somewhere in the patient’s body. Such objective tinnitus is a clinical challenge because it is often difficult to diagnose, and successful treatment may require microvascular or other demanding forms of surgery [23–25].

Although it is normally quite difficult completely to mask pulsatile tinnitus, partial masking of the sound can be very helpful to patients whose sleep or working conditions are disturbed by the pulsatile sounds. If surgical or other treatments for pulsatile tinnitus are not available, then masking with bedside maskers or with masking CDs played over a headset may be a worthwhile option for the patient.
Alprazolam to relieve tinnitus

Alprazolam (Xanax, Pharmacia & Upjohn, Kalamazoo, MI) is an antianxiety medication that has been prescribed for large numbers of patients with troublesome anxiety symptoms (also see generic preparations of alprazolam [26]). Some years ago the authors began to hear from a number of these patients who called the Tinnitus Clinic to say that the alprazolam had reduced their tinnitus. At first it was assumed that the reduction of anxiety was helping these patients to cope better with their tinnitus, and that they were not actually experiencing reductions of their tinnitus. As more such calls continued coming in, however, the authors decided to conduct quantitative research to determine whether alprazolam was having a direct effect on the intensity of the tinnitus. Such research seemed warranted as a means of identifying a potential treatment that might help those patients who are not able to benefit from masking.

Clinical investigations of alprazolam for treatment of tinnitus

The first study was an open study (not a double-blind or placebo-controlled study) to evaluate the subjective loudness of tinnitus and see whether it seemed to be reduced by treatment with alprazolam. A 10-point rating scale was used to obtain tinnitus loudness ratings from a group of 40 patients before taking the drug, and again after they had been taking it for the recommended time. The results in that open study showed that alprazolam did in fact have a direct effect by reducing the perceived loudness of tinnitus [27].

These positive results led the authors to initiate a more rigorous study of alprazolam effects on tinnitus, using a randomized, double-blind, placebo-controlled investigation in a group of 40 healthy adult subjects recruited from the patient population of the Tinnitus Clinic [28]. Half of the subjects were given capsules containing alprazolam and the other half received identical-looking placebo capsules. After completing the required 12-week dosage schedule (which was conducted with appropriate medical oversight), the results of the controlled investigation indicated that 76% of those taking alprazolam reported reduction of their tinnitus, whereas only 5% of the placebo group reported a similar effect. Before treatment the loudness of tinnitus in those taking alprazolam had been matched at an average of 7.5 dB Sensation Level (SL, dB above threshold), and after treatment the mean loudness match was 2.3 dB SL, a highly significant reduction. The placebo group had similar loudness matches before treatment, and there was little or no change in their tinnitus loudness matches at the end of the 12 weeks.

Since that time, it has been the authors’ experience that alprazolam can be an effective treatment for tinnitus in a large number of patients, with proper attention to tapering-on of the drug and with supervision provided by each patient’s physician. It should be emphasized, however, that the drug does not help everyone. There are some patients for whom it provides no
observable change in the tinnitus, and in at least one patient alprazolam increased the tinnitus.

There are generic forms of alprazolam that reduce the expense of the drug and that may be worth trying. For reasons that are not clear, some patients have found that generic forms of the drug were not effective for them even though they found that the Xanax brand gave them excellent tinnitus relief.

**Alprazolam dosage regimen**

Because patients differ greatly in regard to the dose that is effective for reducing their tinnitus, it is important to initiate alprazolam treatment using a gradually increasing dose regimen and with medical supervision. The authors have developed the following regimen, consisting of a trial period that requires 6 weeks and is conducted in the following manner:

- **Weeks 1 and 2:** Take 0.5-mg alprazolam each evening before bedtime. This dose is usually not sufficient to relieve tinnitus but it allows patients to adapt to the drowsiness that often occurs at the beginning of alprazolam usage. All patients should be warned that drowsiness can occur and that they should exercise caution if it does. Such patients may need to avoid driving, operating machinery, or performing other demanding tasks until they have adapted to the drug and drowsiness is no longer a problem; and they should not increase the alprazolam dosage until they have so adapted. Such individuals should continue with the 0.5-mg dose each evening until the drowsy effect subsides.

- **Weeks 3 and 4:** Take 0.5-mg alprazolam twice daily (morning and evening). If this dose of alprazolam reduces the tinnitus to a satisfactory level, the patient continues at this dose indefinitely, under supervision from their own physician. If this dose has not reduced the tinnitus, or has reduced it only slightly, the dosage is increased as follows.

- **Weeks 5 and 6:** Take 0.5-mg alprazolam three times a day (morning, noon, and evening). If this dose level sufficiently reduces the tinnitus the patient continues at this dose indefinitely. In a few cases, taking 0.5 mg three times a day has produced only slight reduction of the tinnitus, and in such cases the authors recommend taking 0.5 mg four times a day.

- If taking 0.5 mg three times a day has no effect on the tinnitus, the authors recommend that the patient gradually discontinue the drug, still under physician supervision, and using a tapering-off schedule as follows.

- Take 0.5 mg twice a day for 3 days, then 0.5 mg once a day for 3 days, then stop all alprazolam. In some patients, a more gradual tapering-off regimen is needed to avoid insomnia or other withdrawal effects.

**Is alprazolam a safe method for tinnitus relief?**

It is clear that patients whose tinnitus cannot be masked need some alternative form of therapy. It is unfortunate that some health care
professionals refuse to prescribe alprazolam for tinnitus, on the grounds that it is habit-forming and dangerous. Although it is true that alprazolam can be habit forming for some (not all) individuals, nevertheless habit-formation is entirely different from addiction. In the case of addiction the individual craves the drug, has to have more and more of it or has to have a stronger and stronger dose, and resorts to extreme behavior to get it. Individuals who take alprazolam for tinnitus relief do not develop a craving for it, nor do they need to keep increasing the dose to maintain tinnitus relief. In fact, some patients find they can reduce the alprazolam dose over time while maintaining the same level of tinnitus reduction and relief. It is significant that alprazolam is not considered a drug of abuse.

It is true that, like many useful medications and caffeine, alprazolam can be habit-forming. Habit formation, however, means only that if one has been taking a drug for some time and then stops suddenly, there can be withdrawal symptoms, which although temporary can nevertheless be unpleasant. For example, it is well known that sudden withdrawal from caffeine can cause such effects. In the case of alprazolam, when cessation of the drug is indicated, withdrawal effects are minimized or prevented by a gradual tapering-off from the drug. Furthermore, when alprazolam is used for tinnitus relief, patients are likely to remain on the drug indefinitely (or at least until a more effective treatment is found); withdrawal effects are typically not an issue.

Obviously, it is always important to use the lowest dosage of alprazolam that reduces the patient’s tinnitus to an acceptable level. Sometimes it becomes possible to reduce the dosage of the drug after a period of several months of satisfactory tinnitus relief. The possibility of such a reduction should be tested at intervals in all patients who take alprazolam routinely. A method that the authors have used successfully, after a patient has experienced tinnitus relief for 4 or 5 months through use of alprazolam, is to reduce the dose by 0.5 mg for a period of 2 weeks to determine if satisfactory tinnitus relief continues to be obtained despite the reduced dosage. If so, further reductions can be tried (each one consisting of 0.5 mg for 2 weeks) until a new level is established. All such dosage adjustments must of course be done with the knowledge and cooperation of the patient’s primary physician.

Alprazolam for treatment of hyperacusis combined with tinnitus

The authors have seen five patients with severe tinnitus who also had hyperacusis (inability to tolerate normal environmental or ambient sound levels). In these five cases, tinnitus masking proved to be ineffective because they had very severe hearing losses in the pitch region of their tinnitus. It was recommended that they try alprazolam. After 7 or 8 weeks each of alprazolam use, these five patients reported not only a reduction in their tinnitus, but the complete recovery of their hyperacusis. Such reports, although anecdotal, suggest the need to study the effects of alprazolam on hyperacusis and tinnitus. In most patients who have both tinnitus and hyperacusis, the hyperacusis is
the more disturbing of the two conditions. Clearly, there is substantial clinical importance to obtaining quantitative evaluation of the ability to treat both conditions with a single medication, such as alprazolam.

Alprazolam is in the benzodiazepine family of drugs. There are at least 16 other drugs in the same family and in the authors’ opinion the possible effects on tinnitus of these other drugs should be investigated to determine their potential as specific tinnitus-reducing agents. For example, bromazepam has been tested in a double-blind, placebo-controlled study in Japan and found to provide effective tinnitus relief in 78% of those with severe tinnitus. Unfortunately, bromazepam has not been cleared by the Food and Drug Administration for use in the United States. Bromazepam is, however, available in Canada. Three other benzodiazepines have been reported to provide tinnitus relief [28], although the investigators who reported those results do not seem to have pursued further use of the drugs. They reported that oxazepam provided tinnitus relief to 12 (52%) of 23 patients receiving the drug; clonazepam provided relief to 18 (69%) of 26 patients; and carbamazepine provided relief to 5 (26%) of 19 patients. It is difficult to judge the reliability of these results because it is not clear whether the observations of tinnitus relief were documented in any quantitative manner. The observations do support, however, the suggestion that the benzodiazepine group of drugs warrants further investigation for possible tinnitus relief.

NOTES

Note 1. Information on how to obtain a wide range of tinnitus masking devices is available from the American Tinnitus Association, PO Box 5, Portland, OR 97207–0005.

Note 2. Masking CDs with music are available from Petroff Audio Technologies, 2346 Bigelow Avenue, Simi Valley, CA 93065 (telephone 805-577-6679, fax 805-577-0473). Portable CD players and headsets that are relatively inexpensive are available through many commercial sources (such as Radio Shack).

Note 3. A masking CD with seven different noise bands, known as the Moses-Lang CD, is available for the cost of the media from the Tinnitus Clinic, Oregon Hearing Research Center, NRC 4, Oregon Health & Science University, 3181 SW Sam Jackson Park Road, Portland, OR 97239–3098 (telephone 503-494-7954, fax 503-494-5656).

Note 4. Information on the HiSonic\textsuperscript{®} TRD is available from Hearing Innovations, Inc. 1938 New Highway, Farmingdale, NY 11735 (telephone 631-927-9100).

References


