

## Artificial Liver Support Systems



Liz Highleyman

*The artificial liver is one of the “Holy Grails” of medical science. Over the past 50 years, several types of liver support therapies have been developed, but none is yet able to completely replace a failing liver for long periods.*


### LIVER FAILURE

The liver carries out many important functions, including the filtering of toxins from the blood and the synthesis of proteins. When the liver is damaged—due to a virus, heavy alcohol consumption, or some other cause—its function may be compromised. *Acute liver failure* (fulminant hepatic failure, or FHF) refers to massive death of hepatocytes (liver cells) and the resulting shutdown of liver functions. This can occur suddenly—for example, due to acetaminophen poisoning or severe acute hepatitis A infection. *Acute-on-chronic* (AoC) liver failure refers to a collapse of liver function in an individual with a progressive liver disease, such as chronic hepatitis B or C, who has advanced to end-stage liver disease (ESLD). The liver has a unique ability to regenerate, and in cases of acute damage the liver may be able to repair itself if the patient can be kept alive long

enough. Decompensated cirrhosis (scarring) due to chronic hepatitis, however, is not reversible.

When the liver’s filtering function fails, toxins (such as ammonia, bilirubin, bile acids, and other metabolic byproducts) build up in the blood. This can lead to hepatic encephalopathy (cognitive dysfunction), cerebral edema (brain swelling), multiple organ failure, coma, and finally death. Patients experiencing liver failure have just a few days to live, and the only real treatment is a liver transplant. But the demand for new livers far outstrips the supply. There are currently some 17,500 candidates awaiting a new liver; in 2003, just 5,600 liver transplants were performed. This shortage is expected to worsen as more people with hepatitis C progress to ESLD.

The standard treatment for liver failure is supportive care to manage symptoms and complications long enough for the liver to begin to repair itself or for a suitable donor liver to become available. But liver support technologies are increasingly used to temporarily take over some of the damaged liver’s functions. Artificial livers are intended to be a “bridge” to liver recovery or



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transplant. Such systems can also help stabilize a patient’s condition after a transplant. Today’s artificial liver support systems are not used over the long term, like kidney dialysis, but researchers hope this may one day be possible.

### ARTIFICIAL LIVER SUPPORT SYSTEMS

Over the past decade several methods have been used to remove toxins from the blood, including blood exchange transfusions, plasmapheresis, and hemodialysis. One early method involved circulating a patient’s blood through a whole pig liver placed by the side of the hospital bed. Later, completely artificial filtration systems were developed, as well as “bioartificial” systems that contain working liver cells—first from rabbits, then from pigs, and finally human cells.

### FILTRATION/DIALYSIS SYSTEMS

#### Liver Dialysis Unit

Some of the first artificial liver systems were mechanical filtering devices. The Liver Dialysis Unit, or LDU (formerly called BioLogic-DT),

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developed by HemoTherapies, was approved by the Food and Drug Administration (FDA) in 1996 and commercially launched in 1999. The LDU is a modified kidney dialysis machine that uses a process called “hemodiabsorption.” Blood is withdrawn from the patient and pumped into the machine, which contains a membrane that separates the blood from a sorbent suspension made up of activated charcoal, cation exchangers, and electrolytes. The machine draws toxins out of the blood, which is then returned to the patient’s body. As with kidney dialysis, treatment lasts for several hours per day, several days per week. Clinical studies showed that patients with AoC liver failure but not those with FHF experienced physiological and neurological improvement (Ash, 2002). Having borne the high costs of developing the device, HemoTherapies went bankrupt in 2001; the patent was returned to the original developer, HemoCleanse, which is working on a second-generation hemodiabsorption device.

### Albumin Dialysis

Charcoal alone cannot remove toxic substances, such as bilirubin, that are bound to the blood protein albumin. In addition, mechanical filtering systems are indiscriminate, removing beneficial as well as harmful substances. To solve these problems, researchers developed a more selective method called albumin dialysis. The most widely used albumin dialysis system is the molecular adsorbent recirculating system, or MARS, produced by Teraklin AG. Blood is pumped into a reservoir containing hollow fibers. As the blood flows through

the fibers, toxins bound to albumin in the blood are attracted to the albumin in a dialysis solution. At the same time, small unbound toxin molecules simply pass through the tiny pores of the membrane. MARS also contains charcoal and anion exchangers, as well as a dialysis step to remove water-soluble substances. The system has been used in thousands of patients and tested in several small trials. In two controlled trials, MARS reduced blood levels of ammonia, bilirubin, and other harmful substances and produced significant improvements in hepatic encephalopathy. In the largest trial to date (24 patients), the 30-day survival rate was 90% for patients treated with MARS versus 55% for patients receiving standard medical therapy (Heemann, 2002). Other studies, however, have produced much lower survival rates. Like the HemoTherapies device, MARS appears to improve survival in patients with AoC liver failure, but this has not been demonstrated in patients with FHF. Further clinical studies of this system are ongoing.

A newer albumin dialysis system called Prometheus is produced by Fresenius Medical Care AG in Germany. In the December 2003 *Journal of Hepatology*, Kinan Rifai and colleagues reported the results of the first clinical application of this system. Eleven patients with AoC liver failure plus kidney failure were treated for more than four hours on two consecutive days. Prometheus treatment significantly decreased levels of ammonia, bilirubin, bile acids, creatinine, and urea in the blood. The system has not been in use long enough to determine if it improves survival.

Other albumin-based systems in development include the fractionated plasma separation and adsorption (FPSA) system and the

single-pass albumin dialysis (SPAD) system. An in vitro (laboratory) study by Igor Sauer and colleagues published in the March 2004 *Hepatology* found that SPAD produced a significantly greater reduction in ammonia and bilirubin levels than MARS, but an earlier study found that MARS was more effective at removing bile acids and other substances.

### BIOARTIFICIAL SYSTEMS

While filtration/dialysis systems can remove toxic substances from the blood, they cannot replicate other functions of the liver, including protein synthesis. Researchers have therefore turned to support systems that utilize actual animal or human liver cells. Today’s bioartificial systems are really hybrids that also have filtration/dialysis capability. The core component of a bioartificial liver system is the “bio-reactor,” which contains active liver cells. Most systems use hollow-fiber capillaries, but some newer systems use various other configurations. A membrane typically separates the patient’s plasma from the liver cells, but allows an exchange of toxins and other substances. As they do in the body, the liver cells take in oxygen and nutrients, and return metabolic byproducts to the plasma. The first bioartificial system used rabbit cells, but today’s systems use pig hepatocytes or cloned human liver cells. It is estimated that at least 1010 liver cells are needed to support a patient with a failing liver. Keeping the cells alive, stable, and functioning optimally is the biggest challenge in developing and using bioartificial liver systems.

### Pig Hepatocyte Systems

Most bioartificial liver systems currently in development rely on

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# HealthWise:

## Mouth Sores



Lucinda K. Porter, RN, CCRC

*Most of us have had a canker sore at least once. These painful lesions in the mouth are common. People living with hepatitis C viral (HCV) infection do not appear to have a greater incidence of canker sores than the general population. However, although not listed as a side effect of HCV treatment, the management of mouth soreness and ulcerations is a common topic discussed among my nursing colleagues who are working with patients undergoing peginterferon and ribavirin therapy. This article discusses mouth sores as well as ways to treat them.*

There are different types of mouth ulcers, but the most common is the canker sore. The medical term for canker sores is aphthous ulcers. Canker sores can bother anyone, but teenagers and young adults are the most likely to have them. There may be a family tendency for aphthous ulcers. The cause of canker sores is not completely understood, but some factors that trigger them have been identified. Some of these are:

- Trauma to the mouth – A misplaced bite to the cheek, a scrape from a crisp chip, hot food or other sources of irritation can often cause the onset of a painful mouth sore.
- Stress – Many canker sore sufferers report a high level of emotional stress coinciding with the timing of the onset of mouth ulcerations.
- Allergies and food sensitivities – Certain foods seem to cause an outbreak of mouth sores. Common culprits are acidic fruits and vegetables such as tomatoes, oranges, and pineapples.
- Sodium lauryl sulfate (SLS) – SLS is a foaming

agent found in most toothpastes and some mouthwashes and may be associated with mouth sores. This may be due to the tendency of SLS to dry the inside of the mouth, but the jury is still out on this connection.

- Hormonal changes – Some women report that the occurrence of mouth sores seems to correlate with hormonal changes that occur during menstrual cycles, pregnancy, and perimenopause.
- Infection – Bacterial, fungal, and viral infections can cause mouth ulcers. Herpes is the most well-known oral viral infection.

- Genetics – Mouth ulcers tend to run in families. There is a 91 % chance that identical twins will both have canker sores whereas this percentage drops to 57 % for fraternal twins.

- Nutritional deficiencies – Some people who have recurring mouth sores also have nutritional deficiencies. These include vitamin deficiencies such as C and some of the B vitamins as well as mineral deficiencies including zinc, selenium, and calcium.

- Medical conditions – Aphthous ulcers are associated with a number of diseases such as HIV, inflammatory bowel, autoimmune, and neutrophil dysfunction diseases. (The neutrophil is a type of white blood cell and plays an important role in the immune system.) Cancer should be ruled out for mouth sores that do not heal.

- Medications – The use of chemotherapeutic agents, beta blockers, and nonsteroidal anti-inflammatory drugs (NSAIDs) have been associated with the appearance of canker sore outbreaks.

*“To the outside eye, canker sores may not appear to be a big deal, but those who have suffered through them know just how painful mouth sores can be.”*

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## MOUTH SORES

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How do you cure canker sores? The answer is you probably can't. There are remedies that can make them less painful or hasten the healing, but like the common cold, there is no reliable cure for common canker sores. The exception to this is if your particular variety of canker sores is caused by an underlying condition that can be changed. Canker sores that are associated with food sensitivities, medications, nutritional deficiencies or the use of SLS can be treated if these conditions are resolved. So, before treating mouth ulcers, it is recommended that you consult your health care practitioner in order to obtain a proper diagnosis.

If there is not a cause for aphthous ulcers that can be fixed, there are some things you can try. Here are some suggestions:

- Maintain oral hygiene. Be gentle with tooth brushing, but don't skip this.
- Avoid dental products that use SLS.
- Drink lots of water. Adequate hydration is important for health maintenance, particularly during HCV treatment.
- Do not drink liquids that are excessively hot. Some people find that ice or frozen juice bars can soothe mouth sores.
- Try over-the-counter (OTC) products that numb canker sores. Products that contain benzocaine, benzoin tincture, lidocaine, camphor, or phenol can provide temporary relief from the pain of mouth sores. Orabase® and Zilactac-B® are two examples of OTC products used for mouth sores.
- Apply a protective barrier to the lesion. There are OTC products

that form a film to cover mouth lesions, making them less vulnerable to irritation.

- Maintain good nutrition by eating well. You may want to discuss with your doctor if you should take a multivitamin or other dietary supplement. Some people suck on zinc lozenges, but there is no data to support their effectiveness.

- Avoid foods that are hard, crunchy, spicy, salty, or acidic.

- Reduce stress.

- Keep a food diary to see if a particular food is the cause of mouth sores. Try eliminating suspected foods.

- Swish, then spit or swallow a teaspoonful of an antacid such as milk of magnesia (magnesium hydroxide) or Mylanta® (aluminum and magnesium hydroxides) with a teaspoonful of liquid Benedryl® (diphenhydramine) four to six times daily.

- Try tea. Black and some herbal teas are high in tannin. A "used" tea bag placed on a canker sore may provide relief.

- Consider taking anti-inflammatory medication such as ibuprofen. Be careful because this medication can be the cause of aphthous ulcers and not everyone can or should take ibuprofen.

- Acetaminophen (Tylenol®) may help to reduce pain.

- Lysine may be beneficial for herpes-related mouth sores. 500 mg one to three times daily is the general recommendation.

There is a long list of herbs from many healing traditions, all used for mouth sores. Most of them claim to cure canker sores after three weeks of consistent use, but since canker sores usually resolve in three weeks, it is difficult to establish the efficacy of these herbs. However, some herbal remedies may provide relief. Herbs

and dietary supplements should always be used cautiously since some herbs should not be taken by people with liver disease. The simultaneous use of herbs and antiviral treatment has not been well-studied. Sage and chamomile can be infused in water and used as a mouthwash four to six times daily. Raspberry, peppermint, and licorice may be beneficial. Echinacea may speed healing but should not be used during HCV treatment, if you are HIV-positive, or if you have an autoimmune disease. Talk to your healthcare provider about herb use prior to using herbs.

If nonprescription remedies don't provide sufficient relief, talk to your doctor about prescription drugs. Depending on your particular condition, there are a number of different prescription choices. Aphthasol® is a relatively new medication that forms a protective barrier when applied over mouth ulcers. Corticosteroids mixed into Orabase® are sometimes used. Your doctor may prescribe a liquid antibiotic mouth rinse. Thalidomide is sometimes prescribed for HIV patients suffering from severe aphthous ulcers, but these should not be used in non-HIV patients or any pregnant woman.

Your doctor may prescribe a mouth solution of viscous lidocaine, magnesium hydroxide antacid, and diphenhydramine to be swished and either swallowed or spit out, depending on the instructions. Viscous lidocaine can be prescribed alone and applied to mouth sores for temporary relief. If your doctor prescribes a medication that needs to be applied directly to the canker sore, do the following: Dry the sore by gently dabbing the sore with a tissue. Put the medicine on a clean cotton swab and dab the

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# How to Start an HCV Support Project: Part 3



Alan Franciscus, Editor-in-Chief

*There are many different types of support groups serving the various needs of the HCV community. Try to decide beforehand what type of support group you envision—but a word to the wise: be prepared to change the group format based on the needs of the entire group.*

## **TYPE OF SUPPORT GROUP**

There are many types of support groups ranging from strictly informational to emotional support groups. In general, all meetings have an educational element and provide emotional support, but how you define and set up the group will set the tone for the type of group you envision. Keep in mind that some people are uncomfortable coming to a “support group” but feel very comfortable attending an informational meeting or a group that is not labeled as a support group.

### **Drop-in Support Meetings**

Drop-in groups are very important for people who need to receive emotional support and education, especially in a time of crisis. People who attend these meetings may also attend the meeting to learn more about community resources, which may include information about other types of meetings and support groups.

### **Informational Meetings**

Informational meetings are geared mainly towards people who

want to learn more about hepatitis C in general or about a certain topic related to hepatitis C. This is the preferred format for people who want to educate themselves and connect with other hepatitis C individuals, but who may not feel comfortable talking about very personal issues with others. Even though the main focus is on education, there is an element of emotional support given since there are others who attend the meetings with similar interests, fears and questions. In fact some informational meetings end with people talking in-depth to the expert speaker, facilitator or others about various issues which may include personal stories or feelings.

### **Emotional Support Group Meetings**

Support groups that concentrate on emotional support explore almost every aspect of hepatitis C, and this type of environment helps people to really connect with other others living with disease. Since it is more personal in nature than an informational meeting, this support group format can also be more intense and may bring up many issues and feelings. This series is mostly focused on providing tools to people who wish to start emotional based support groups, but much of the information can be applied to any type of support group.

There are many important decisions that a potential support group leader needs to make before

convening the first group meeting—finding a location, selecting a meeting format and other issues that, when planned well in advance, will help to make the support group successful.

### **Closed or Open Group?**

Structure is a very important part of the group dynamic. Some groups like having new members at each weekly meeting as long as there is a core group that they can rely on for support. It is important to remember that new members will most likely have issues that they think need to be addressed immediately. It is also important to realize that the new member might be exposed to more information than they are ready to handle emotionally. For example, if some members are dealing with issues about end-stage disease, a new member might become afraid and panicked. It's a fine line between the need to support current members and being sensitive to those recent members who may have been recently diagnosed, or others who are not educated about hepatitis C or ready for the emotions that may overwhelm a new member.

It is a good idea to interview potential members before they start attending the group, including when the group is launched. During the conversation, you can assess whether the person would be a good fit. It is appropriate to

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pig hepatocytes, which are readily available and can be cryopreserved (frozen) for storage and transport. These systems can be used for several hours at a time. The major concern with using animal cells is the risk of transmission of viruses and other infectious organisms. In clinical trials to date, however, porcine endogenous retrovirus (PERV) has not been detected in patients.

The HepatAssist bioartificial liver, developed by Circe Biomedical, is furthest along in clinical trials. Achilles Demetriou and colleagues conducted a multicenter, randomized, controlled Phase II/III trial that included 171 patients (147 with acute liver failure, 24 with graft failure after a first transplant); results were published in the May 2004 *Annals of Surgery*. Half the patients received HepatAssist treatment, half received standard supportive therapy. Intracranial pressure (due to brain swelling) and mental functioning improved in the HepatAssist group, but there was little evidence of protein synthesis. Overall 30-day survival rates were 71% for HepatAssist and 62% for controls—not a significant difference. Looking only at patients with acute liver failure, however, the corresponding rates were 73% and 59% (a 44% improvement). The FDA has requested an additional Phase III trial before granting approval. Circe was not able to fund more trials and went bankrupt; Arbios Technologies acquired Hepat-Assist this past April and is seeking funding to complete the trials.

Other bioartificial liver systems utilizing pig hepatocytes include Excorp Biomedical's Bioartificial Liver Support System, or BLSS (in Phase I/II trials); the Algenix LIVERX2000

system, which embeds pig cells in collagen (also in Phase I/II trials); the Academic Medical Center-Bioartificial Liver (AMC-BAL), under development in Europe; and a hybrid artificial liver support system known as TECA-HALSS, under development in China.

### Human Cell Systems

The potential problems of pig hepatocytes have led some researchers to focus on bioartificial systems that utilize human cells. Human hepatocytes would be the ideal cell for a bioartificial liver, but they are hard to culture and preserve and quickly lose their liver-specific functionality. The extracorporeal liver assist device, or ELAD (developed by VitaGen), uses an immortalized human liver cell line called C3A, derived from hepatoblastoma (a type of liver tumor) cells. Unlike pig cell devices, ELAD can be used continuously for up to 10 days. In a randomized, controlled study of 24 patients with FHF, encephalopathy worsened in 25% of patients receiving ELAD treatment, compared with 58% of patients receiving standard supportive therapy (Ellis, 1996). Looking at 17 patients who were not eligible for transplants, survival rates were similar in the two groups (78% for ELAD, 75% for controls), in part because the controls survived longer than expected. Among transplant-eligible patients, the corresponding rates were 33% (1 of 3) and 25% (1 of 4). Another randomized Phase I/II clinical trial included 24 patients with FHF (Millis, 2001). In the ELAD group, 12 of 15 (80%) were successfully bridged to transplant or recovery, compared with 5 of 9 (56%) in the control group. For the 19 transplant-eligible patients, 30-day survival rates were 83% in the ELAD group and 43% in the control group. This study, however, was not powered to determine ef-

ficacy, and the results may have been due to chance. VitaGen discontinued Phase II studies of ELAD and folded due to a lack of funding; Vital Therapies, Inc. acquired the technology in October 2003 and is continuing clinical trials.

Another bioartificial system, known as the modular extracorporeal liver support (MELS), uses immortalized human hepatocytes derived from donor livers that were not suitable for transplantation (Sauer, 2002). This system has been used in Europe to successfully bridge patients to liver transplants. A group from Italy recently described the first case in which a patient with FHF was bridged to transplant using a bioartificial system with cryopreserved human hepatocytes. But MELS and other human hepatocytes systems are limited by the same problem that plagues liver transplantation: insufficient supply.

### THE FUTURE

In summary, the literature on artificial and bioartificial liver support systems indicates that they are generally safe and lead to improvements in laboratory parameters and clinical conditions such as hepatic encephalopathy. However, it has been difficult to demonstrate a survival advantage over standard medical care, in part because most studies so far have been small. While there is evidence that liver support systems can improve survival in patients with AoC—the type most likely to occur in people with chronic hepatitis B or C—the same is not true for FHF.

Liver support technologies have improved dramatically in recent decades, but further research is still needed. One line of research involves developing longer-lasting

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human hepatocyte cell lines, and finding ways to keep hepatocytes alive and functioning outside the body. Ultimately, it may become possible to use human hepatocytes created through bioengineering or derived from stem cells in bio-artificial systems or even to grow entire new livers. But research requires adequate funding. As the bankruptcies of several companies working on artificial liver systems demonstrates, it is difficult to obtain enough money to develop a promising medical technology that does not have a large potential market. It is therefore encouraging that the U.S. government has decided to extend “orphan drug” status (which provides longer exclusive marketing rights for medications needed by fewer than 200,000 people annually) to cover Excorp’s “orphan” bioartificial liver.

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## MOUTH SORES

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sore with the swab. Do not eat or drink until the medication has had a chance to dry and form a barrier. Use all medicine for the length of time your doctor advises.

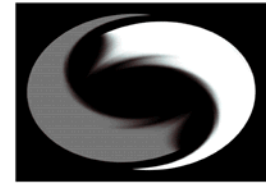
Mouth sores can be agonizing and can interfere with eating and quality of life. Do not ignore mouth ulcerations that are very painful, large, recur, do not heal, or appear in clusters. To the outside eye, canker sores may not appear to be a big deal, but those who have suffered through them know just how painful mouth sores can be. Those who acquire mouth sores during HCV therapy can have an especially hard time. Reducing pain and controlling recurrences can help immensely and improve quality of life.

### Additional Resources:

- American Family Physician  
[www.aafp.org](http://www.aafp.org)
- American Academy of Family Physicians  
[www.familydoctor.org](http://www.familydoctor.org)
- Mayo Clinic  
[www.mayoclinic.com](http://www.mayoclinic.com)

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## SUPPORT GROUP

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be very honest during this process. It is not that you want to exclude someone from the group but there are reasons that some people might not be a good fit with the other members.

### *Examples:*

- “Our support group is for members who are very sick. Are you able to handle this type of discussion and deal with the emotions that may surface?”

- “Our group is very clear that the mode of transmission is not discussed and that people are not discriminated against because of past or current behavior. Do you think you could accept this?”

If for some reason this is not practical, a list of support group guidelines for all members should be discussed at the beginning of the session. Examples of group rules will be discussed later in this series.

### **How Many Members?**

Support groups come in all sizes! If there are two people at a meeting it can be a very powerful support group. The size of the group will depend on the type of group you want to start. An emotions-based support group that has many members may become too impersonal for this type of format. Conversely, an informational meeting may benefit by having more people attend since the members have attended to learn more about hepatitis C in general or about specific topics from a speaker rather than from other group members. The meeting space or room also dictates the amount of people that can attend a support group. In gen-

eral very few emotions-based support group have to worry about too many people attending since most people live very busy lives that may prevent them from attending every meeting. If you add hepatitis C related fatigue to the equation you will find that there will always be some members who can not attend every meeting. A good number of members is between six and fifteen members. The general rule is that 10% of members will not show up for any number of reasons. If there are more than 10-15 members it may be difficult for every member to have time to talk about their issues. A group meeting that has eight members attend is the best for everyone getting his or her needs met. Even if every member does show up for one meeting, steps can be taken to make sure that everyone is served. There are always exceptions and a lot depends on the support group members' expectations, meeting space and goals of the support group.

### **How Often Should the Group Meet?**

Generally, the nature of the support group will dictate how often it should meet. Monthly meetings work best for informational meetings. Support groups that are geared towards providing emotional support will work best if members meet every week or every other week. These types of groups can meet once monthly, but the close personal connection so important for these types of groups is difficult to maintain when people only see each other once a month.

### **How Much Time for Each Meeting?**

As expected, the length of the meeting time can vary depending on the format of the group. In general, an hour is probably not long enough for everyone to get his or her emotional needs met. An hour

and a half usually works best for most groups, but some groups may need even more time. It is highly recommended that, if the group meets for longer than an hour, the members are given a short break halfway through the meeting to allow for a stretch or bathroom break. It is, however, important that the break(s) be kept short so that any issues brought up before the break can be resumed with little effort. The exception would be if you divided the support group into two parts – one part for information or education and one part for emotional support. A little longer break is helpful for this type of group to help the group transition from one type of format to another.

It is very important to make sure that the length of time agreed upon by all of the members is strictly followed—always start and finish on time. People have very busy schedules, and if a support group starts late or ends late the attendance will suffer. Starting and stopping on time will also help send a message that everyone needs to show up on time out of respect for the other members. However, it is also wise to be prepared to extend the meeting time under certain situations where emotional issues have surfaced during the meeting that require additional time in order to provide support to a member. But the entire group should make the final decision as to whether to stay or leave. The leader or other members can always stay over to talk to a member who needs additional support.

### **What Time Frame – Ongoing or Limited?**

As the name suggests, a ongoing support group can run for an indefinite period of time. A time limited

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support group is set up so that the support group members know the exact date when the group will begin and end. A group that ends at a specific date works well for people who may not want to commit to coming to a support group over an extended period of time. Time limited support groups can run for any period of time, but generally run for a period from a few weeks to several months. This is also an excellent format for people who want to see if they are suited to running a group and an opportunity to work out the “bugs” before making a commitment to start a permanent or ongoing group. This is also an excellent way for other group members to become more involved in

the group. If the group members form personal attachments to the other group members, they may decide to meet informally or may even decide to “take over” the existing group or form another group. This allows for the current facilitator to take a well-deserved break before starting another group.

Next month I'll discuss:

- *The meeting location*
- *The meeting space*
- *Suggestions for seating arrangements*
- *Should you allow food and beverages?*
- *Educational materials*



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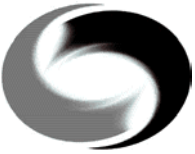
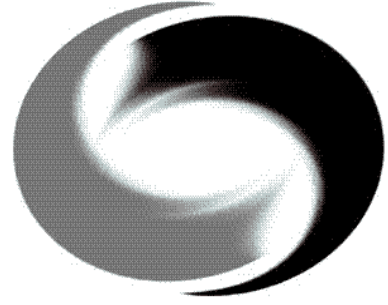
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