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# Coping Strategies in Conjunction with Amputation

-a literature study

Coping strategier i samband  
med amputation  
-en litteraturstudie

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## Summary

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## Abstract

Amputation affects men and women of all ages, classes, races and religions. The patients' reactions are, however, entirely unique. This is a literature study comprising fourteen scientific articles which make up the results. The psychosocial effects of amputation can be daunting and considering the mountain of literature on the subject, it is therefore necessary to start by explaining some of the research on stress, crisis, and coping. Brief descriptions of Lazarus's and Cullberg's work have been selected to represent a sample of existing theories which have grappled with these psychosocial concepts. The purpose of this study is to describe the various coping strategies utilized by patients who have undergone amputation. The results consist of seventeen coping strategies which are divided up into five theme groups (positive coping, avoidance coping, social support, maladaptive coping, and religion). Evidence is provided which describes how the various coping strategies can actually manifest themselves in reality as witnessed by amputee patients. In conclusion, amputees use various coping strategies at different stages of recovery to deal with the trauma of their loss; these strategies can be observed and identified in both clinical and out-patient settings.

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## **Introduction**

### **Amputation**

Amputation means surgical removal of an organ or body part on account of trauma or disease (Almås, 2002). There are approximately 2000 amputations performed annually in Sweden alone and 99% of these are leg amputations. Amputations were performed as long as 45,000 years ago and it was, up until the 1800's, an extremely painful and often deadly procedure on account of the lack of awareness regarding antiseptic hygiene, and also the fact that the surgical technique itself was, up to the last century, poorly developed (Ploug et al., 2001). The physical and psychological consequences of amputation are dramatic and lifelong, and this reality can have a profound impact on the amputee's adjustment to their disability (Almås, 2002).

Amputation can be divided up into two clearly identifiable groups: the first group consists of healthy, often younger individuals who happen to have fallen victim to amputation following a traumatic accident. These persons usually have a long term survival rate as well as successful recuperation. The second group are often older with various chronic illnesses such as diabetes and peripheral vascular disease, which complicate their long-term medical prognosis considerably (Houghton, Taylor, Thurlows, Rootes & McColl, 1992).

To try and describe, much less fully understand the shock and lifelong effects of amputation can be very difficult. However, one interesting aspect of amputation is the broad spectrum of psychological responses encountered by healthcare workers. This can be attributed to the wide variety of causes for amputation, the relatively equal distribution between both genders and age groups and the degree of disability (Rybarczyk, Nicholas & Nyenhuis, 1997). It is generally accepted that the traumatic loss of limb(s) is considered equal to castration, the loss of a spouse, or death by those who have experienced any one of these events (Gallagher, Allen & MacLachlan, 2001). In a study by Parkes (1975), the grief process of a group of amputees and a group of widows and widowers was compared. There was usually a strong preoccupation with thoughts of the lost person or body part and a tendency to visualize this with extraordinary clarity. Grief is a natural process of mourning and of intra-psychic readjustment and can be severe and long lasting. There are five stages of grief: denial, bargaining, anger, depression, and acceptance. All of these points lead to a change in a patient's body image. Body image is the conscious and unconscious concept of one's body. It contributes to a person's sense of identity (Mohta, Sethi, Tyagi & Mohta, 2003). Neither should the fundamental differences between men and women be underestimated. Societal expectations and social injustices play a major role in how an individual perceives him or herself (Parkes & Napier, 1970). There has also been speculation regarding the connection between pain and psychosocial dysfunction and gender (Whyte & Carroll, 2004).

One particular complication, that is unfortunately, not uncommon, is Phantom Limb Pain or PLP. As many as 85% of amputee patients suffer from reported post-operative PLP (Hanley et al., 2004). This is not to be confused with stump pain (experienced by all amputees) which is pain at the actual wound site. PLP is the sensation of pain where

a limb no longer exists (Hanley et al, 2004). Phantom experiences occur because the brain still has an image of the extremity, despite the limb being amputated.

There are in fact two specific kinds of phantom experiences: the first is phantom pain and the second is phantom limb which is simply the feeling that the amputated limb still remains. Phantom limb can lead to practical difficulties in situations where for example, the patient hops out of bed in the morning, forgetting one leg is gone. Phantom pain however, is a neurologically caused pain which most amputees experience after their operation. This pain can also be attributed to a nerve or neuroma which is being squeezed somewhere in or at the stump site. A neuroma is made up of nerves which have grown together into a ball shape after having been cut during the amputation. These neuromas can be surgically removed, but they often grown back. The pain attacks may come intermittently, like a flash, and can be very severe. It has been described as if something is pulling on the toes or even hammering on them. An important pre-operative, pain preventive treatment consists of psychologically preparing the patient for the amputation; the post-operative treatment for phantom pain consists of various kinds of pharmaceutical preparations such as: anti-depressives, anti-epileptic medicine, and medicine to treat high blood pressure (Almås, 2002; Ploug et al., 2001).

This phenomenon of phantom pain can have drastic and long-lasting impact on the patient's ability to recuperate or even wish to attempt to rehabilitate him or herself. Pain is, for the reasons mentioned above, also a pivotal factor in the development of psychological regression (Mohta et al., 2003). Psychologists therefore have a role to play in the treatment of patient's depressive state caused by phantom pain. A feeling of helplessness can otherwise ensue, which can have a devastating impact on long-term prognosis of the patients involved. This in turn can lead to a reduced likelihood of participation in social activities (Hanley et al., 2004).

### Care

It is important that the patient receives as much information, moral and practical support, by healthcare personnel during both the pre-operative as well as the post-operative phases of the treatment as is deemed desirable. This is of course dependent on the wishes and motivation of the patient him/herself as this has a direct effect on the healing and eventual rehabilitation of the patient. Martin Buber (1954) has written that there are two ways to affect another person:

first there is the propagandist who has no real interest in people and wishes nothing other than to force his will and his attitude upon another and second is the pedagogue who on the other hand, wishes an exchange with another. All that is necessary is recognition and support, traits that are already innately inherent in the other person.

Post-operative care can be said to be concerning the control and treatment of any infections, bedsores, and/or oedema (Almås, 2002). That stress and adjustment to stress are always shifting means that there is a constant need to observe the patient closely. Despite the necessary, aforementioned complications, it is according to HSL (1993:17)

*“important that all health-care personnel not only engage themselves in the obvious, physical aspects of the sickness/disability, but to see their patient from a holistic perspective, and take into consideration every patient's right to contribute with their own resources, to their own care” (Authors' translation).*

Knowledge of a patient's past coping history can give valuable clues as to how they will react to the present crisis (Mao, Bardell, Major & Dimsdale, 2003). It can also be of great help to know what the lost limb or organ had for significance and meaning for that particular patient (Cullberg, 2003). Every patient, regardless of their gender, age, social class or reason for amputation must adopt their own approach to deal with this new situation. The term commonly used today by healthcare professions to describe their patients many different means of managing their disability is coping.

### **Stress**

Before one seeks to explain what coping encompasses or what effects, if any, its employment might entail, one should be made aware of the force that lies behind any individual's general use of coping in the first place. This may be summed up in a single word: stress. Stress is a bodily or mental tension resulting from factors that tend to alter an existent equilibrium. Lovallo (2005) noted that the definition has two elements.

*"First there is a tension, presumably caused by some force pulling on the system.*

*Second, the tension is a threat to the normal equilibrium of the system" (p.29).*

Furthermore, without a compensatory element to remove or minimize the strain on the object or person in question, there is a real risk that damage to that system or person will eventually occur. One compensatory element is coping. The definition of stress also implies that there are two bodily components, one physical and one psychological, which are not separate from each other, but constantly interacting. It has been claimed, however, that there can not be physical stress without some psychological component, but psychological stress may exist without having any physical origin (Lovallo, 2005). One extreme example of psychological stress is Post Traumatic Stress Disorder (PTSD). In this case, strong feeling, thoughts and nightmares intrude on an individual, long after the original cause has vanished (Desmond & MacLachlan, 2005). It is easy enough to imagine and measure how outer, physical stressors, such as exercise or viral infections can have a negative impact on a body and it's functioning, but stressors which are of a purely psychological or emotional nature can be more difficult to identify and examine. Pain, Anxiety, Depression, and Post Traumatic Stress are some of the factors to consider when discussing Coping.

### **Coping**

It is critical to be able to recognize the various signs of patient suffering or maladaptive (or well-being/adaptive if that is the case) behaviour, their inherent causes/diagnoses, and the defence mechanisms by which the patient compensates, in order to eventually choose that method of treatment which is regarded as the most effective for that individual, at that time, because coping strategies are often considered time-dependent and situation-specific (Livneh, Antonak, & Gerhardt, 2000). At times of crisis, how well a person ultimately succeeds in managing the wide range of intense emotions, the physical limitations imposed upon an amputee, and the resulting stress of these variables, depends greatly on an astounding array of contextually limited psychosocial factors which are unique for every individual. Life is always in a state of flux (Lazarus, 1993).

Richard Lazarus' and Susan Folkman's (1984) biopsychosocial model of psychological stress describes how our contact and interaction with environments, both internal and external may produce emotional (psychosomatic) reactions that can lead to bodily

stress. Compared to traditional biological models concerning theories on pain, biopsychosocial models have shown themselves to be more appropriate to explaining and understanding chronic pain as recent research has shown that there is a real interaction between the psychological and biochemical sections of the human body (Lovallo, 2005). Physical and psychological variables are constantly engaged with each other based upon an inherent feedback mechanism (Hanley et al., 2004). According to Lazarus and Folkman (1984), they claim that all stress starts from a cognitive view of the world. That means that we analyse and evaluate whether a particular event entails a threat to us, either physically or psychologically. This primary appraisal can be considered as a kind of intellectual culling process to help us to avoid crashing blindly into dangerous situations. Lazarus and Folkman (1984) claim that there are three kinds of primary appraisals:

- (1) Irrelevant
- (2) Benign-positive
- (3) Stressful

If the encounter is deemed to be (1) irrelevant, nothing happens, because nothing is threatened or lost. No commitment is therefore necessary. (2) Benign-positive appraisals occur if the outcome preserves or enhances well-being or promises to do so (Lazarus & Folkman, 1984). These positive feelings such as love, happiness, exhilaration, joy, etc. can however lead to apprehension in some persons who are convinced that one must pay a price for all positive feelings. (3) Stress appraisals concern concepts of a) harm/loss, b) threat, and c) challenge. a) Harm implies that the damage has already been done, loss of social position or loss of a loved person, a major life crisis where some crucial commitments or beliefs have been lost are managed (either positively or negatively) by stress mechanisms (coping). b) Threat is an anticipated incapacitating injury or illness. Even after the damage is already done, threat is always involved because of the risk for more loss or harm in the future. According to Lazarus and Folkman (1984) there is an opportunity here for planning for the future. This is called anticipatory coping. c) Challenge appraisal can occur simultaneously with threat, although the focus here first is on the possibility for gain or growth. In such cases the accompanying emotions are upbeat and positive. Examples of some positive feelings are: eagerness, excitement, and exhilaration, but if there is a threat of harm or loss, the emotions present will then be characteristically negative, feeling such as fear, anxiety and anger. In certain cases it can be said that threat and challenge interweave creating shifting appraisals as the situation changes. Whether an encounter is considered positive or negative depends on which coping strategies are utilised. It is hypothesised that challenged persons are more likely to have a higher quality of functioning, better morale, and even superior overall health than those persons who perceive the same event as solely a threat (Lazarus & Folkman, 1984).

After a person has determined whether an event is irrelevant, benign-positive or stressful, he/she moves the process to the next step: how to manage the perceived event. This is called the Secondary Appraisal and it is behavioural in nature and it is a critical aspect of every stressful encounter as the final outcome is dependent on what can be done about the event and/or what is at stake of being lost or damaged. The secondary appraisal is not so much a mental list-making of what might be done, but a complex evaluative process that takes into account which coping options are available, the likelihood that a given coping option will accomplish what it is supposed to do and the

likelihood that one can apply a particular strategy or set of strategies effectively (Lazarus & Folkman, 1984).

Finally, reappraisal refers simply to a new appraisal based on previous events (earlier appraisals) (Lazarus & Folkman, 1984). This dual approach (cognitive and behavioural) to information processing has an impact on a number of bodily functions that are regulated by the endocrine and autonomic systems, which in turn have a reciprocal effect on the neurophysiological and emotional systems (Lovallo, 2005). Together, all these complimentary systems have an impact on, and are impacted by, the various Coping Strategies.

### **Crisis and Coping**

Johan Cullberg (2003) theory of humans in crisis can help to better understand the mechanisms behind the use of coping strategies. He writes that there are four phases in any crisis. These phases describe how individuals react to and deal with dramatic events in their lives in order to return themselves to some acceptable level of functional normality. The first two phases are considered to be separate halves of an acute whole. Every phase however, may have its own unique defence mechanism to cope with the situation as it appears at the moment.

1. Shock phase
2. Reactions phase
3. Adaptation phase
4. Reorientation phase

The shock phase can last anywhere from a few seconds up to several days. The person in shock removes him or herself from the outer world in order to protect their ego for a time. At this point a primary appraisal has already evaluated a threat to the body, leading to a secondary appraisal, which is behavioural, directing the mind (and overwhelming it) and even though persons in shock may, on the outside, appear to be normal, their inner self may be in complete turmoil. Things that have been said or events that have occurred during the shock phases can be completely repressed and/or forgotten. Some may be vocal or hysterical while others may simply sit and stare at the floor (Cullberg, 2003).

The reaction phase shouldn't last longer than 4- 6 weeks. This phase implies that a person has begun to realise what has actually happened and opening their eyes, started to meet this new reality. The afflicted person often repeats the same questions: why has this happened to me? What have I done to deserve this? Why now? Feelings of guilt can plague the person, who convinces him or herself that they are to blame for the incident (self-criticism) (Cullberg, 2003).

The adaptation phase means that the person has finally started a process to accept the accident, illness, etc. and leave the incident behind them while beginning to look forward (planning). This phase may continue up to a year after an accident. This is a critical phase, where the patient is now often at home, away from a clinical environment. At this point it is crucial that the person has the support of their family and/or social circle in order to continue with the ongoing, inner adaptation work (social support) (Cullberg, 2003).



Finally, there is the reorientation phase. This means that the person has accepted (successful coping) the occurrence and begun to live their life in their new situation. They have naturally not forgotten what has happened, but have come to terms with it and perhaps have found, for example, a new hobby or sporting activity which they are capable of participating in, in spite of a leg amputation (Cullberg, 2003).

### **Coping Strategies**

There are approximately 10 coping measures available today (Livneh et al., 2000). This list, according to Carver, Scheier and Weintraub (1989), covers most of the major coping strategies that occur amongst trauma and chronically ill patients who have undergone amputation and gives a clear idea of the scope and scale of the different themes.

**Active Coping-** is the process of taking active steps to try to remove or circumvent the stressor or to ameliorate its effects. **Planning** – is thinking about how to cope with a stressor.

**Suppression of Competing Activities-** means putting other projects aside, trying to avoid becoming distracted by other events, or even letting other things slide, if necessary, in order to deal with the stressor. **Restraint Coping-** is waiting until an appropriate opportunity to act presents itself, holding oneself back, and not acting prematurely. **Seeking Social Support for Instrumental Reasons-** is seeking advice, assistance, or information. **Seeking Social Support for Emotional Reasons-** is getting moral support, sympathy, or understanding. **Positive Reinterpretation-** is a type of emotion-focused coping aimed at managing distress emotions rather than at dealing with the stressor per se. **Acceptance-** is a functional coping response, in that a person who accepts the reality of a stressful situation would seem to be a person who is engaged in the attempt to deal with the situation. **Turning to Religion-** might serve as a source of emotional support, as a vehicle for positive reinterpretation, or as a tactic of active coping with a stressor. **Focus On and Venting of Emotions-** is the tendency to focus on whatever distress or upset one is experiencing and to ventilate those feelings. **Denial-** is the refusal to believe that the stressor exists or of trying to act as though the stressor is not real. **Behavioural Disengagement-** means reducing one's effort to deal with the stressor, even giving up the attempt to attain goals with which the stressor is interfering. **Mental Disengagement-** occurs when conditions prevent behavioural disengagement. **Alcohol and Drug Disengagement-** is the ingestion of drugs or alcohol in order to avoid or alleviate the effects of a stressor (Carver et al., 1989).

**Self-Criticism-** is the tendency to blame oneself for one's predicament, regardless of whether there is basis for blame or not. **Social Withdrawal-** removing oneself from friends, family, community in order to avoid any embarrassing, difficult, or negative situations. **Wishful Thinking-** Similar to fantasy. This is an escapist tactic used to limit hurtful stressors (Livneh et al., 2000).

Traditional (western) medical wisdom has long stated that one must often wait until psychological difficulties have manifested themselves as an illness or a disability which can then be observed, measured, and treated. Indeed the 18<sup>th</sup> century Scottish philosopher, David Hume, asks us rhetorically of the value of a book which does not contain abstract reasoning about quantities and numbers, or experimental reasoning regarding real relationships and existence. If the answer is that it contains none of the

above-mentioned qualities, then we are encouraged to cast that book into the fire (Thuren, 2003)! This is a fine example of the positivistic thinking that still permeates modern medicine today. In the case of an amputee who is suffering from anxiety or depression this can lead to weeks, months or even years of perhaps unnecessary pain, both physical and mental. Lazarus and Folkman's (1984) biopsychosocial model of psychological stress response emphasized perceived control over the environment as a critical determinant of the psychological impact of events. A sense of control may be achieved through the usage of humour as it can be an effective tool for facilitating coping (Rybarczyk et al., 1997). An important aspect of this research in chronic pain has led to the realisation that cognitions (thoughts, beliefs, appraisals) play a important role in the expression of pain and how the pain directs and is directed by the perception of the patient, as far as concerning the situation at hand in regards to their disability.

Information that is available today concerning coping and amputation is vast and at times confusing. An identification and understanding of relevant coping strategies can assist the healthcare-professional/caregiver to expedite the choice and implementation of a proper treatment to best affect an amputee's ability to come to terms with their present situation, perhaps easing their suffering and shortening their rehabilitation time.

### **Purpose**

The purpose of this study was to describe the various coping strategies utilized by patients who have undergone amputation.

## **Method**

This is a literature study which means that a compilation of earlier studies, reports, and other relevant literature are presented. The authors shall systematically examine this literature in accordance with Polit and Beck's (2006) eight steps.

1. Keywords or concepts shall be sought and identified.
2. Potential references shall be located either electronically and/or manually.
3. Promising references are examined for suitability.
4. The acceptable references are collected
5. These relevant references are read and notations made.
6. The references are organised.
7. The material is analysed and integrated.
8. The study is written.

### **The literature search and selection**

Formal database searches were carried out in CINAHL and Medline. The key search words are to be found in Table 1. There were even some informal searches made using Google's search engine in an attempt to locate extra material and to discover if there would be significant differences between the various databases. If a promising lead was found through Google, it was then manually sought out through Academic Search Elite, under Publications. In this manner, it was also possible to check any potential articles for their professional quality, research ethics, and availability. The keywords (search words) were the same for all searches regardless of the database. The authors chose during every search to reduce the amount of suitable articles to circa two hundred per search, at which point it was feasible to review them one by one, judging first by their title, and then if they seemed promising, read their abstract to determine if they were appropriate for the study (primary selection). This was accomplished through the extensive use of the Thesaurus function in CINAHL, while Medline and its Mesh function was used to a lesser extent. Having found promising articles on the internet, they were then read online and either accepted or not, and were removed from the list immediately (secondary selection).

In addition, manual searches were made using the library catalogues of both Karlstads Central Hospital and Karlstads University to retrieve more literary information. These searches gave results and the material found in this literature constitutes a portion of the information presented in the report. Review articles were examined and they too proved to be useful sources for references. Manually sought articles (non-review) were then either found in the library archives or were ordered specially and mailed directly to the authors.

### **Inclusion and Exclusion Criteria**

The authors have primarily limited the article search to literature in English and Swedish. There has been no limit set as to the age of the article so long as it met the study's criteria. Articles which dealt solely with limb amputation of trauma and/or chronic disease patients were focused upon, thereby reducing the need to exclude many studies that dealt primarily with underlying illnesses such as Diabetes or Peripheral Vascular Disease (PVD) and treating the subsequent amputation merely as a secondary complication. Search words such as children and surgery were considered as exclusions

criteria, because they led to an excessively broad article selection. Studies that were concerned solely with concept of Coping were considered as well. Patient age did not play a role in the choice of literature as either inclusions or exclusions except, when it pertained to children. All forms of amputations have been included, as lower-leg amputations were shown to be too narrow as a research topic. Many of the articles that were found chose to make no such distinction between upper and lower extremity amputation. The authors included fourteen articles in the results and are presented in appendix 1.

*Table 1. Presentation of search words, database, hits, and selection*

Database	Search words	Hits	Selection 1	Selection 2	Selection 3
CINAHL	1. Amputation	1912			
	2. Coping	8563			
	1 and 2	23	9	7	5
Medline	1. Amputation	16780			
	2. Coping	60255			
	1 and 2	151	37	7	5
Manual search			11	9	4

### **Data Analysis and Scientific Examination**

A continuous process of evaluation and quality control was done during each search and once again afterwards when the chosen material was received by the authors. This was carried out in accordance with the protocol established by the Health and Care division at Karlstads University (2004). Every chosen article was then read by each respective author and its contents discussed as to its relevance. This was accomplished in accordance with the recommendations of Forsberg and Wengström (2004), as well as Polit and Beck (2006). The authors sought to find information concerning the nature of each strategy, either statistically or through illustrative quotations. Having found the desired material, it was then summarized and placed accordingly as to its content. The results categorization is based upon the decision to adopt portions of the strategy categorization as presented by Livneh's et al. (2000) structure of coping rapport. The five main theme groups and seventeen strategies is the product of a compilation of various coping instruments or measures. A list of 14 strategies, which was originally derived from the COPE Inventory (Carver et al., 1989) was used in addition to 3 extra concepts expressed by the Coping Strategies Inventory (Livneh et al., 2000). These 3 extras were: Wishful thinking, Self-criticism, and Social withdrawal. Livneh's et al (2000) rapport combined all seventeen strategies in their study which the authors' chose to adopt for their own work.

### **Ethics**

The authors have examined as objectively as possible, all sources of information for their ethical consideration and checked to see if the material was peer-reviewed. The texts were not fundamentally altered as to content and where necessary, to preserve contextual integrity, exact quotations are provided (Polit & Beck, 2006).

## Results

### *Coping Strategies*

The results consists of five theme groups (positive coping, avoidance coping, support, maladaptive coping, and religion) of seventeen coping strategies. Some strategies are both adaptive and maladaptive depending upon the time since amputation (Livneh et al., 2000). The general coping mechanisms used by individuals appear to fluctuate across time as psychological demands change (Oaksford, Frude & Cuddihy, 2005). Each strategy listed below is therefore placed into a context as to its literal appearance, usage and/or prevalence of occurrence as it actually occurs among amputees.

### *1. Positive Coping Strategies*

A positive attitude has been shown in several studies (Desmond & MacLachlan, 2005; Dunn, 1996; Livneh et al., 2000; Oaksford et al., 2005) to have beneficial health effects such as less anxiety, anger and depressive symptomatology. This approach strengthens and is strengthened by a sense of control (feedback mechanism) which is central to that person's not experiencing helplessness, which has been demonstrated to complicate recovery.

### **Active Coping**

Amputees that utilise a more active problem-solving approach and rely less on emotion-focused coping and cognitive disengagement were connected to lower levels of reported depression. Put another way, an amputee's greater use of active coping and less use of passive coping strategies are associated with fewer depressive symptoms and greater adjustment and acknowledgment of disability (Livneh, Antonak & Gerhardt, 1999). Furthermore, Desmond and MacLachlan (2005) have stated that this factor most convincingly influenced psycho-social adaptation to amputation. Some persons take charge of their predicament:

*"I changed to a different occupation where I became very successful"*  
(Dunn, 1996. p.291).

Making a contribution and being a productive member of society was considered paramount and having the opportunity to engage in productive endeavours of various kinds became important (Ferguson, Sperber-Richie & Gomez, 2004).

### **Positive Reinterpretation**

Studies of amputation and coping have shown (Dunn, 1996; Livneh et al., 2000; Oaksford et al., 2005) that adopting this strategy is associated with more effective or successful adaptation to life stresses and challenges.

*"I have come to realize that there are many people who have more and bigger problems than I and I am lucky to have what I have"*(Dunn, 1996, p. 291).

*"There's no point feeling sorry for yourself, what's the point in that, you've got to look on the bright side. I've still got a lot to look forward to" and "The silver lining, really, is that I'm still alive. Let's face it, I could be dead"* (Oaksford et al., 2005, p. 271).

### **Planning**

This is can be contrasted with maladaptive strategies such as Social Withdrawal. The patient makes conscious choices and is preparing for or actually engaged in social activities or goals.

*“I try to keep myself as fit as I can. I am going to continue to do my exercises and walk better so I can get out and about more” (Oaksford et al., 2005, p. 271).*

### **Acceptance**

Psychosocial adaptation occurs over time and the age of the amputee has been shown to affect their acceptance of limitation imposed on them by amputation. In other words, the younger the patient, the more difficulty in accepting and adjusting to amputation (Desmond & MacLachlan, 2005; Livneh et al., 1999; Oaksford et al., 2005).

*“It’s just one of those things. This is it, and I’ve got to get on with it” (Oaksford et al., 2005, p. 271).*

Livneh et al. (1999) found a positive relationship between increased acceptance of disability and the use of active coping among amputees. In a study by Sjö Dahl, Gard and Jarnlo. (2004) it was reported that of 11 amputees interviewed, only one indicated that he fully accepted his situation.

### **2. Avoidance Strategies**

The cause of amputation has been shown to affect the degree of usage of avoidance strategies. Congenitally ill amputees were significantly less likely ( $p < .05$ ) to use avoidance than those patients whose prosthesis was the result of traumatic injury (Gallagher & MacLachlan, 1999).

At least in the long term, extensive use of avoidance has been shown lead to higher levels of anxiety and depression than the use of positive coping strategies. In addition to those findings, it was shown that avoidant coping strategies were associated with lower levels of general adjustment (Desmond & MacLachlan, 2005). When pain-relieving medicine has no effect it is not uncommon for patients to utilize self-distraction in order to alleviate suffering (Gustafsson et al., 2002). In one study (Sjö Dahl et al., 2004) it was reported by most of the participants that they had difficulty looking at their (amputated) leg directly after the operation and they totally refused to be involved in any activity that uncovered the amputated leg.

### **Suppression of Competing Activities**

This can be described as abandoning activities which are no longer possible to perform (Gustafsson et al., 2002).

*“I used to hunt, but I’m going to have to give it up” (p.7).*

In one study by Miller, Deathe, Speechley and Koval (2001) concerning fear of falling among amputees, it was found that balance confidence is important to function, mobility, capability, and engagement in social activities. This fear of falling leads to a preoccupation with one’s balance.

*“I know I can’t drive timber. It won’t work. I am not supposed to and I can’t manage it. Things will work themselves out. I have to put it aside until this is finished... I have not been distressed, I have to put it aside.” (Gustafsson et al., 2002. p. 5).*

### **Wishful Thinking**

This is considered a passive strategy where the patient chooses not to confront the problem of amputation facing them, choosing instead to retreat into a world free from threatening situations and can be coupled with mental disengagement (Livneh et al., 2000). It has been pointed out though that over-usage of any avoidant strategy can lead to maladaptive outcomes.

### **Focus On and Venting of Emotions**

In the report by Parkes (1975) it was shown that 11% of the amputees wept during an interview. Pining, bitterness and depression may alternate. Various feelings or emotional reactions that arise can lead to different rehabilitation outcomes.

### **Restraint Coping**

Coming to grips with the loss of a limb was found to be easier in some amputees when they managed or contained their emotions (Gustafsson et al., 2002). In the comparison between widows and amputees, it was reported that both groups tended to try to avoid distressing thoughts of their loss or attempted to master themselves by controlling their emotions in situations that reminded them of their loss (Parkes, 1975).

### **3. Support**

There are two main groups of social support: Instrumental and Emotional support. In both forms, there has been demonstrated an increased level of social adaptation. In one analysis, it was shown that seeking social support was positively associated with prosthetic use and also lower rates of depressive symptomatology (Desmond & MacLachlan, 2005). However, there are differences between the various kinds of support and not all have beneficial outcomes. Solicitous support for example, which entails another person's (spouse's, friends', and neighbours') sympathetic response to a patient's pain may actually lead to the patient feeling a sense of helplessness and lethargy, after not being able to do anything him/herself. Testing indicated that with greater social support, but less frequent solicitous responses at 1-month post-amputation associated with greater reductions in pain interference (Hanley et al., 2004). Amputees often underestimate the implications, both physically and psychologically, of coming home to an environment which is fraught with unexpected obstacles which were never a problem before their amputation, such as climbing a set of stairs or opening a window (Sjödahl et al., 2004). Concerning pain, one study showed that patients who received support before amputation were less likely to suffer from PLP than those patients who hadn't received any support (Gallagher & MacLachlan, 1999).

### **Seeking Social Support-Instrumental Reasons**

This concerns the practical details of everyday living and it entails those aspects of life that have become more complicated, such as installing a wheelchair ramp at home or assistance with children at day-care. This is most important at the beginning, during the initial adjustment and according to Oaksford et al. (2005), can continue up to a year afterwards. The need for support then decreases with time.

### **Seeking Social Support-Emotional Reasons**

The patient can have a need to discuss the situation either with other amputees or a sympathetic friend or family member:

*"I look to my daughter for help, and she's been an absolute godsend. I couldn't have coped without her" (Oaksford et al., 2005, p. 271).*

The social reception that greets an amputee has an important impact on that person's adjustment. Uncertainty surrounding the reaction of friends and family members can lead to patients feeling uneasy at the thought of returning home. According to Delehanty and Trachsel (1995) there was a significant difference between spouses regarding the perception or feelings of stress. This has an impact on family interactions.

#### **4. Maladaptive Strategies**

This collection of terms have been connected with a worsening of a patient's physical and psychological well-being, resulting eventually in further physical and/or psychological symptoms such as anxiety (Gallagher & MacLachlan, 1999).

##### **Social Withdrawal**

In the study by Delehanty and Trachsel (1995) reported that the concept of phobic anxiety can lead to social withdrawal. This includes the

*“fear of travelling and public transportation, uneasiness in crowds, discomfort eating or drinking in public places, feeling self-conscious, and avoidance of things, people, or places” (Delehanty & Trachsel, 1995, p.68).*

In some cases, this social isolation can be forced upon the amputee against their wishes. As one landmine survival expressed it:

*“I get really upset when I get into some situation and someone says ‘Oh you’re disabled, so many able-bodied people are available these days’- if this society cannot accept me as capable, how will they accept the others?” (Ferguson et al., 2004. p.934).*

Social withdrawal can result when some amputees choose to avoid certain old friends on account of their well-meant, but misplaced solicitous support (Parkes, 1975). Certain studies (Desmond & MacLachlan, 2005; Dunn, 1996; Sjødahl et al., 2004) have shown that a patient's age plays a definite role in the ability to successfully cope socially with amputation. Younger patients often long for the sense of freedom that they had before their loss of limb. This leads to the attempt to hide the disability and therefore choose recreational activities that they could do at home. Indeed the restriction of activity is one important factor to consider when discussing the link between age and depression, because the restriction of routine activities can be more problematic for younger amputees. In Dunn's study (1996), the younger patient did show higher levels of depressive symptomatology which led to their not partaking in certain social activities. Pain has been shown to facilitate the tendency to catastrophize (Whyte & Carroll, 2004) and it negatively affects balance confidence and that in its turn, had a negative impact on social activity (Miller et al., 2001).

##### **Denial**

The obvious physical loss of a limb cannot be ignored, but the psychological implications can be repressed by individuals who are not yet capable of coming to terms with their loss. In this way can denial become a positive, albeit, short-term solution that supports emotion-focused coping, however, in the long term it has been associated with higher levels of depression and hostility (Livneh et al., 1999).

##### **Behavioural Disengagement**

Parkes study (1975) of 46 amputees it was demonstrated that eating disorders did appear to affect 33% of the participants after four to eight weeks after the surgery.

##### **Mental Disengagement**

This has also been described as cognitive disengagement. This has been positively linked to three negative psychosocial outcomes: depression, externalised hostility and a lack of acceptance of their disability. According to Delehanty and Trachsel (1995) this has been described as paranoid ideation where one blames others for their problems and feel that others are unsympathetic or that they take advantage of them. This can also manifest itself in a series of passive behaviours such as going to the movies or day



dreaming. The amputees reported that they disconnect from his/her present reality (Livneh et al., 2000).

### **Alcohol and Drug Disengagement**

Studies have shown (Gustafsson et al., 2002; Oaksford et al., 2005) that smoking is a relatively common means of dealing with the stress of amputation and patients who do smoke have claimed that they couldn't handle the situation otherwise:

*“If I stopped smoking, I couldn't cope, I'm sure I wouldn't. What nicotine does for me, it helps me relax, chill out, you know” (Oaksford et al., 2005. p. 271).*

Parkes study (1975) showed that sleeping aids (i.e. sleeping pills) were relatively common amongst amputees. In the study by Miller et al. (2001) of 435 amputees, it was reported that 17.7% drank alcohol daily, post-operative.

### **Self-Criticism**

Self-criticism, such as blaming one's self for the amputation, may lead to non-productive behaviours that can be linked to negative health outcomes (Ferguson et al., 2004).

## **5. Religion**

According to Livneh et al. (2000) this category is represented by “hope, optimism, or spirituality” (p.239) as opposed to pragmatic realism.

### **Turning to Religion**

In a study by Dunn (1996) it was demonstrated that religious affiliation had no significant impact on levels of depression in amputated patients. But, it could affect a person's overall outlook on life. Livneh et al. (1999) states, there are two methods of interpretation. It is possible to call religion as optimistic and/or positivistic whereby the believer is comforted by the hope that their convictions endow them with the strength to overcome their disability. The second interpretation is abstract versus concrete solutions. Here religious faith is stacked against active planning or seeking the advice of others. Spiritual beliefs contribute to a sense of optimism (Ferguson et al., 2004).

*“All good has come out of it. I found God through it. It has given me purpose. It makes me special” (Dunn, 1996, p. 291).*

## **Discussion**

The purpose of this study was to describe coping strategies utilized by patients who have undergone amputation. The results show that there are numerous kinds of coping strategies which are available and used by amputees which either positively or negatively affect a patient's well-being.

The result has been compiled by an interpretation of various studies (Gallagher & MacLachlan, 1999; Hanley et al., 2004; Livneh et al., 1999) which focused on different effects of coping, most often the outcome of coping on other phenomena, such as depression or anxiety. This means that the authors chose to present simplified summations of sometimes complex report findings. Certain Coping Strategies were shown to be more prevalent amongst patients than others and this is reflected in the

findings. This can depend upon the purpose of the study and the nature of the measuring instruments (coping scales). As reported by Hanley et al. (2004) there seems to be evidence that suggests that certain coping strategies (such as avoidance and social withdrawal) are more important than others (such as wishful thinking and behavioural disengagement which were remarkably absent from most reports) when considering functioning and pain for example. This is probably true of other forms of disability and illness. Coping strategies have been shown to vary according to each situation.

Virtually all studies on coping have shown the benefits of positive thinking. Positive strategies affect a wide range of psychosocial measures and this attitude has been linked to quicker recoveries and a reduction in patient suffering, both physically and psychologically (Livneh et al., 1999). What they do not say is how to achieve this desirable end. It would therefore be advantageous to all patients if an effective intervention was established which could lead the amputee towards a more beneficial outcome. The evidence is mounting that there is a physical response to every thought or emotion (Lovallo, 2005).

It is important for healthcare workers to be able to recognise when avoidance behaviour has gone from a temporary coping strategy to a chronic, maladaptive response (Parkes, 1975; Sjö Dahl et al., 2004). Short-term avoidance acts as a buffer, while long-term avoidance tends to leave the patients unwilling to engage in effective therapies. Rehabilitation can be more complicated the longer the time goes, without a realistic self-evaluation by the amputee, negative trends become if not irreversible, much more difficult to change (Cullberg, 2003). How and when this shifts from a positive coping strategy to a negative one is not easy to see since certain behaviours are both good and bad depending on how long they have been employed by the amputee.

Support can and has been argued to be both its own coping strategy and a coping resource affecting other strategies. Many studies in fact treat support as its own category of coping (Delehanty & Trachsel, 1995; Gustafsson et al., 2002; Livneh et al., 2000; Oaksford et al., 2005). It is obvious that without any kind of support, all other aspects of patient recovery become difficult if not to say impossible.

Maladaptive coping strategies is an important category and can almost be viewed as the result of the failed use of other coping strategies such as avoidance. In virtually all cases are these strategies linked to negative psychosocial outcomes such as depression. Therefore preventing these adaptations ought to be a priority among healthcare workers. Social withdrawal for example, is complex and it is interesting to note that it can be self-imposed upon a patient based on their own incorrect interpretation of other's reactions (Delehanty & Trachsel, 1995). By refusing to come to grips with their disability (denial) in a timely fashion, can some amputees eventually be compelled to seek concrete solutions long after the actual operation has taken place (Livneh et al., 2000). Concerning the strategies Behavioural and mental disengagement they are actually two sides of the same coin (Carver et al., 1989). The only real difference seems to be that mental disengagement might not, at least not at first glance, be so easy to observe. Whereas behavioural disengagement can be seen from the effects of the disengagement (in this study, it was represented by eating disorders), mental disengagement may take the form of a series of routines which are carried out without

thought or enthusiasm. Drug abuse is obviously damaging and it seems that in most studies this refers to nicotine and alcohol usage and therein lies a problem with all studies that have been examined in this report, namely that drugs of a more insidious nature (heroin and cocaine for example) are possibly under-represented here, because the users of such drugs either are not included in any study or they don't want to admit that they are ingesting illegal substances for the researchers. Self-criticism causes negative behavioural patterns and this may be the result of their altered body-image (Rybarczyk et al., 1997).

One very interesting point which ought to be considered is that irregardless of whichever religion one professes to believe in, a faith meant a tendency to focus on the positive aspects of the situation and on feeling of hope (Dunn, 1996; Ferguson et al., 2004).

According to Oaksford et al. (2005), all forms of coping are shown to be affected by humour, and humour has been used by some patients to help facilitate coping and by others as the essential ingredient to coping:

*"I've got a friend up the road who's an amputee too, and we go for a few beers, and we joke that we're off to get legless at half the price" (p. 271).*

Concerning humour, it also seems to be an integral part of the process of coping. This can be interpreted as a positive means of dealing with a crisis and has been described by some as either real or imagined as a way of making a problem or handicap less threatening (Gustafsson et al., 2002). Oaksford et al. (2005) claims that humour is its own strategy, but the authors did not agree, because humour permeates all other coping strategies and situations.

Two additional factors which are not given their own unique place in this study are pain and gender. They were considered at first to warrant an independent examination, but it was decided that it wasn't feasible to call them coping resources. They are, however, important aspects to take into consideration when discussing amputation. An amputation means pain for the patient and this is reflected in every single study concerning the loss of limb(s) or organ(s). Pain permeates every phase of rehabilitation facing an amputee. It has been suggested that the consequences of pain can eventually be diminished social activity (Miller et al., 2001). The work by Lovallo (2005) has pointed out the possible implications of the interaction between the physical and psychological components of pain. Therefore, on account of these potential, long-term negative psychosocial outcomes, it is desirable to ensure that an amputee has as little post operative pain as possible. Gender naturally has a place in every general discussion concerning people's health. It's no secret that the sex of an individual places particular demands and/or expectations on that person and this may or may not be reflected in the results of this study. It seems that it depends greatly on how a question is formulated. In a study by Parkes (1975), it was shown that after 13 months, up to 78% of women persisted in visualising the lost limb compared to 27% of the men. The men in this same report were more concerned with the financial impact of their disability than the women. To present amputation's effect on a person's sense of priorities for example, without taking into consideration the consequences of the general public's perceptions based on traditional gender roles might lead to a series of false conclusions.

The cause of amputation and the site of loss of limb play an important and measurable role in a patient's ability to cope with the repercussions of their plight (Gallagher & MacLachlan, 1999). Pain, post traumatic stress, depression and anxiety must be tackled using Coping mechanisms inherent in every patient (Desmond & MacLachlan, 2005). Psychologists therefore have an important role to play in the psychosocial adjustment of amputees (Ploug et al., 2001).

It is important to realise that none of the results described above are absolute. There is no perfect subjectivity or objectivity for that matter. There is a constant interaction between the two and as no two moments or situations are alike, so it is not possible to recreate the exact same findings with two completely separate people. What this can mean is that even if a healthcare worker correctly identifies the stage of crisis a patient is in and is aware of the coping strategy employed, there is no 100% guarantee that the intervention intended to deal with that particular situation will be effective. At best these definitions are guidelines only. Deciding which strategy is most appropriate for the moment can be difficult to say, although according to a report by Ridder and Schreurs (2001), situations that can be controlled are better dealt with in a problem-focused, approaching fashion, while emotion-focused coping and avoidance are superior strategies in situations beyond control.

A study presented in 2000, by Livneh et al. concluded that the methods of coping used by amputated persons were not substantially different from the coping strategies used by people who are not disabled or suffer from other forms of disability or illness. This leads to the possibilities of utilising the lessons learned in other fields of medicine and drawing on the findings and suggestions concerning coping strategies of other groups of patients such as cancer and heart disease. With the help of sound, reliable coping measures, it can be ascertained whether there exists any maladaptive coping strategies and what effect they have on the patient's everyday life. Therefore it was reasoned that clinicians and other caretakers may wish to explore the possibilities offered by use of one or more effective cognitive-behavioural therapies, helping their patients to recognise the benefits of the treatment, by practicing them under controlled conditions and eventually incorporating these skills into their lives on a daily basis.

In the future, it would be interesting if more researchers were to study the long-term effects of coping and amputation, as many reports are not longitudinal and it's not possible to see if any patients have benefited from any rehabilitative intervention.

It is not clear from this study if there are significant differences in the rates of successful readjustment after amputation between men and women, although it was mentioned in one article (Parkes & Napier, 1970) that the two sexes had generally differing ways of comprehending the meaning of their newly acquired disability. Thus, it can be of interest at some future point to present findings along the lines of gender differences.

## **Method Discussion**

The authors found it at times impossible to repeat the results of certain electronic searches. This happened regardless of database. Despite using the exact key words and the same methodical process every time, it was not uncommon for each author to get a completely different search results than the other. This was the case when the findings were compared from different days. In addition, the concept of coping was, for the

authors anyway, relatively new. Initially, the focus was solely upon amputation, but as the work progressed it was discovered that coping strategies themselves don't differ from each other based on the illness or disability (Livneh et al., 2000). It was decided to include any Coping study that might have some relevance, either psychologically or therapeutically, to amputation. However, the authors did not include any report in the results which did not specifically deal with both coping and amputation. As the article searching progressed, it became more and more obvious, certain words and phrases kept repeating themselves in the titles and abstracts. And some did not. There are apparently more popular coping strategies (coping hierarchy) than others (Hanley et al., 2004).

In addition to Coping and Amputation, the authors chose to begin their search by combining words and concepts, such as avoidance and body image, in order to try and find as many appropriate articles as possible. This practice, however, was quickly abandoned. Several articles were excluded while the search was confined solely to the internet. This meant that certain studies were eliminated (on account of the change of search words) before the study had even begun to be written. Eventually it became less and less necessary to search electronically, as if blind, as more often than not many new sources of information were discovered from the reference literature lists of the studies already in the authors' possession. This meant that the need to search using any terms other than Coping and Amputation was quickly eliminated.

One difficult dilemma which the authors faced was not finding suitable research material, but deciding where to draw the line and limit the scope of this study. There were, however, no articles found (suitable to the authors' purpose) which were written in Swedish. All material gathered had been translated to English for use on the internet. The decision to not limit the age of the articles is based on the results of these searches. It seems that there has been an explosion of literature about coping and amputation in the last fifteen years and those few books and studies that were published earlier that were acceptable, have shown themselves as having relevance even today. This might indicate that coping has only recently been considered as an acceptable area of study within the scientific/biomedical community. The presentation of coping strategies without putting the concept in some form of context seemed unfeasible. As many psychosocial concepts, model theories overlap each other (the authors felt that certain aspects of Cullberg and Lazarus theories seem very similar), it was deemed impossible to adequately describe coping without, for example, mentioning Stress. Stress being the root of the imbalance which leads to the various, compensatory coping mechanisms (Lovallo, 2005). This led to the above-mentioned editing difficulties. Therein lies a problem with this report, in that the authors had to reduce or eliminate certain facts, ideas and strategies in favour of others. The purpose was after all to describe coping strategies, not necessarily reveal how many amputees have turned to avoidance strategies to deal with their loss.

The decision to not set an upper age limit on patients was based solely on the fact that not one study resembled the other in this respect. These studies often took the first patients available who met their basic criteria. The focus has been to study the effects of coping or amputation and not the age of the patient. Children, however, have in most areas of medicine, unique care needs, and seem to fall within their own special area of study, thus meriting independent research and were therefore excluded from our report.

One potential problem with the articles is the participants themselves. In all the previously mentioned studies it appears that some of the results may be predisposed to be overly positive. As Lazarus (1993) pointed out that patients may be unaware that their own responses are in fact affected by sub-conscious choices, while others wished to please the researcher by giving what they deemed as correct responses (Ferguson et al., 2004). The persons involved in these studies have all freely agreed to participate and that can mean that they have already come a good bit of the way towards recovery. Someone who feels terrible might not be so keen to sit and fill out questionnaires or discuss their feelings with researchers. If this is the case, one must conclude that all the findings are slightly biased.

There seems to be unwillingness among the multitude of researchers to agree on the superiority any one model has over another, although it is obvious that certain methods of measuring Coping Strategies have certain advantages over others. Indeed,

*"a major weakness of many coping measures centres on their unstable factor structures and lack of cross validation" (Desmond & MacLachlan, 2005, p. 2).*

The researchers all seem to agree upon disagreement. After scouring various articles about Amputation and Coping, it was found that those article that utilised the COPE Inventory were the easiest (for the authors' purposes) to comprehend and analyse thereby eliminating the need to redirect considerable effort to the interpretation and comparison of different models of Coping measurement. Livneh et al. (1999) pointed out that there is a notable lack of consistency in the definition of psychosocial adaptation. This is reflected in the various approaches to measurement.

Another complicating factor which the authors ran into more than once was the differences in the usage of the terminology. Take avoidance again, as an example. Some researchers chose to refer to avoidance as its own coping strategy in their results (Gallagher & MacLachlan, 1999), while others (Livneh et al., 2000) claimed that it was merely a convenient term to act as an umbrella to cover more specific coping strategies, which were then presented independently. This meant that if the reader doesn't have a copy of the original text to examine, it was at times unclear as to what phenomena exactly certain studies were trying to describe. The subject of wishful thinking is another such example where it isn't entirely clear which category of coping strategy it belongs to. Depending upon when it is utilized, and for how long it can be construed as either an avoidant or as a maladaptive strategy. The authors had an extremely hard time attempting to define the seventeen strategies. This fact reflects the inherent weakness of this study: namely that the authors' interpretation of the definitions of the various strategies is wide open to debate. After many searches and conversations with various professional health experts, it became painfully clear to the authors that everyone knew coping when they encountered it, but they couldn't define it!

Despite a vast ocean of quantitative studies concerning different aspects of Coping, it is presumed by many researchers apparently that all consumers of their research are well acquainted with the subject matter. But it doesn't help the average healthcare worker to know that a certain percentage of their patients are Behaviourally Disengaged if they don't know what Behavioural Disengagement is in the first place. Qualitative studies on the other hand are more unusual, although this approach provides methods that enable the researchers to gain a deeper understanding of unique experiences (Sjödahl et al.,

2004). Qualitative reports tend also to be easier to understand without the necessity of extensive knowledge of the subject matter. It is hoped that this study can serve as a modest starting point for those persons interested in the phenomenon known as Coping.

## **Conclusion**

This study has attempted to show how coping strategies may actually appear amongst amputees. There are several coping options utilized by these patients, depending on the individual circumstances and resources available to each amputee. These strategies can then be observed and identified both in clinical and out-patient settings at various stages of recovery.

## **What this report contributes**

There is, according to Lazarus (1993), a lack of information surrounding the concept of Coping. He claims that it is not enough to merely compile results from questionnaires (not even his own test), because the truth can be compromised by the respondent's own defences that he/she may not be conscious of. A heightened awareness of Coping among all healthcare professionals can well be in order. Therefore, knowing what Coping is, what it arises from, and how it can seriously affect (either positively or negatively) the long-term prognosis of an amputated patient, irrespective of which kind of Coping strategy employed, may lead to a quicker, more accurate diagnosis, more effective treatments, and ultimately leading to better overall care for the patient.

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## Appendix .1

Author/ Year	Title	Purpose	Method	Finding
Delehanty, R.D., & Trachsel, L. (1995)	Effects of Short-Term Group Treatment on Rehabilitation Outcome of Adults with Amputation.	The aim of the study was to explore outcomes following a preventive psycho-educational group intervention for amputees	Quantitative study. 20 participants in the treatment group. 21 in comparison group. Quasi experimental design.	That group treatment reduces distress depressive symptoms.
Desmond, D.M., & MacLachlan, M. (2005)	Coping strategies as predictors of psychosocial adaptation in a sample of elderly veterans with acquired lower limb amputations.	The study examined the contribution of coping strategies to the prediction of psychosocial adjustment.	Quantitative study. 796 participants. 156 reductions. Postal questionnaires	Multiple facets of psychosocial functioning of individuals with lower limb amputation were significantly and differentially associated with demographic/ disability related factors and coping strategies.
Dunn, D.S. (1996)	Well-Being following Amputation: Salutary Effects of Positive Meaning, Optimism and Control.	The aim was to examine the salutary effects of finding positive meaning in a disabling experience, being an optimist and perceiving control over disability on two criterion variables of psychological well-being: Depression and Self-esteem.	Quantitative study. 138 participants. Mail in survey on psychosocial adjustment to limb amputation. Regression analysis.	Optimism and perceived control over disability were predictive of lower scores on depression scales and higher scores on the Rosenberg Self-esteem scale.
Ferguson, A.D., Sperber – Richie, B., & Gomez M.J. (2004)	Psychological factors after traumatic amputation in landmine survivors: The bridge between physical healing and full recovery	The study examined psychosocial aspects, coping strategies, and resilience characteristics of limb loss survivors across differing cultural, societal and economic backgrounds.	Qualitative study. 85 participants. Semi structured interview. Grounded theory for analysis.	Three salient factors have a significant role In facilitating healthy psychological recovery. (1) immediate care and rehabilitation (2) social integration (3) economic integration.
Gallagher, P., & MacLachlan, M. (1999)	Psychological adjustment and Coping in Adults with Prosthetic Limbs.	The aim of the study was to explore the relation between adjustment to a prosthetic limb, demographics, disability-related variables and coping.	Quantitative study. 44 participants. 26 % response rate. Questionnaire	Amputees experience both pain and emotional maladjustment need more than a well-fitting limb and training. Coping varies across demographic and disability-related variables.
Gustafsson, M., Persson, L-O., & Amilon, A. (2002)	A qualitative study of coping in the early stages of acute traumatic hand injury.	The aim was to identify coping strategies, defined as thoughts or actions in the early stages of a traumatic hand injury.	Qualitative study. 20 participants. Interviews. Grounded theory for analysis.	It showed that each individual used several coping strategies with different characteristics.
Hanley, M.A., Jensen, M.P., Ehde, D.M., Hoffman, A.J., Patterson, D.R., & Robinson, L.R. (2004)	Psychosocial predictors of long-term adjustment to lower-limb amputation and phantom limb pain.	The aim of the study was to evaluate the utility of a bio psychosocial model to predict long-term adjustment to lower-limb amputation and phantom limb pain.	Quantitative study. 70 participants. 19 reductions. Randomized controlled. Coping strategies questionnaires (CSQ).	Psychosocial factors in the early stages after amputation contributed to the prediction of long-term adjustment.

Livneh, H., Antonak, R.F., & Gerhardt, J. (1999)	Psychosocial adaptation to amputation: The role of sociodemographic variables, disability-related factors and coping strategies.	Examine the role of sociodemographic variables, disability-related factors and coping strategies as predictors of the psychosocial adaptation.	Quantitative study. 61 participants. Questionnaire	The findings suggested that the predictors examined in this study contributed differentially to explanation of the variance in the eight psychosocial outcomes.
Livneh, H., Antonak, R.F., & Gerhardt, J. (2000)	Multidimensional Investigation of the Structure of Coping Among People with Amputations.	The aim of the study was to provide initial empirical data on the dimensional structure of coping with disability-related stress among amputees.	Quantitative study. 61 participants. 32% return rate.	Three dimensions of coping most cogently explain the variance in the responses obtained from the present sample of respondents. The three dimensions reflect: adaptive versus maladaptive, abstract versus concrete and external versus internal.
Miller, W.C., Deathe, A.B., Speechley, M., & Koval, J. (2001)	The Influence of Falling, Fear of Falling, and Balance Confidence on prosthetic Mobility and Social Activity Among Individuals With a Lower Extremity Amputation.	The aim of was to assess in amputee patients. The relationship between having fallen in the past 12 months, fear of falling and balance confidence on prosthetic mobility performance and social activity.	Quantitative study. 435 participants. Response rate of 77%. Population based survey and chart review.	Balance confidence affects mobility capability, performance and social activity.
Oaksford, K., Frude, N., & Cuddihy, R. (2005)	Positive Coping and Stress-Related Psychological Growth Following Lower Limb Amputation.	The aim of the study was to present a cross-sectional qualitative exploration of how individuals cope with a lower limb amputation.	Qualitative study. 12 participants. Semi structured interviews. Grounded theory for analysis.	It lends support to the evidence that some people psychologically strengthened and able to derive some benefits from a difficult life stressor.
Parkes, C.M. (1975)	Psycho-social Transitions: Comparison between Reactions to Loss of a Limb and Loss of a Spouse.	Compare psychosocial transitions in order to examine if they give rise to a pattern of response to better understand the causal mechanisms which underlie such reactions.	Qualitative and Quantitative study. 46 amputees. Interview.	It showed that amputees had overt distress in the early post-loss phase and that it's equivalent even a year after.
Sjödahl, C., Gard, G., & Jarnlo, G-B. (2004)	Coping after Trans-Femoral Amputation due to Trauma or Tumour- a Phenomenological Approach.	The aim was to describe by phenomenological approach, how relatively young trans-femoral amputees experienced their amputation and their coping strategies in the acute phase and over time.	Qualitative study. 11 participants. 5 reductions. Interviews. Taped and transcribed verbatim.	Two themes emerged. First the experience of the amputation, denial and avoidance were the coping strategies mainly used. Second Coping strategies to relate to the new norm. Informants used downward comparison, positive comparison and repression. Only one informant accepted his situation.
Whyte, A., & Carroll, L.J. (2004)	The relationship between catastrophizing and disability in amputees experiencing phantom pain.	Sought to examine the effects of catastrophizing in a working-age amputee population experiencing phantom pain.	Quantitative study. 315 participants. 62% response rate.	Catastrophizing is a significant predictor of self-reported disability in a amputee population.