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POLYHERBAL FORMULATION FOR MUSCULAR DYSTROPHY

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Abstract— Muscular Dystrophy is an inherited disorder caused due to a deficiency in dystrophin. The main focus of this paper is formulating new components, especially Indian herbs for the treatment of the Disease. Formulations prove that natural components serve as the best cure since they have no diverse effect on one's body. They are stable and quite robust. Thus, it is a good alternative to the synthetic drugs as it produces promising results.

Keywords— Muscular Dystrophy, Dystrophin, TCM, Shasti, Shali, Pinda, Sweda.

I. INTRODUCTION

Muscular dystrophy is an inherited disease, affecting the males usually and is often fatal. A mutation in the DMD gene in Xp chromosome leads to partial or complete absence in the dystrophin. Progressive degeneration of the skeletal muscles makes it abnormally susceptible to contraction induced sarcolemmal damage leading to muscle fibre disfunction, necrosis and replacement of lost tissues by adipose and connective tissues, causing atrophy. The progressive muscle degeneration ultimately leads to loss in ambulation and pulmonary failure.

Muscular dystrophy can be categorized into 9 sections based on the type and location of mutation. This is presented in Table (1).



Fig. 1. Different herbs used

II. OBJECTIVE

The main objective of this project is to demonstrate the causes, clinical symptoms and ultimately provide a guide to a promising cure. As known that Ayurveda is known as “Mother of all healing”. This paper presents a hypothetically prepared polyherbal medicine for Muscular Dystrophy.

III. CLINICAL MANIFESTATIONS

Genetic mutation because of absence of dystrophin causes a disturbance in the metabolism. The clinical manifestation includes oxidative stress, chronic inflammation or continuous muscle contraction. Associated problems include tendon and muscle contractures, progressive kyphoscoliosis, impaired pulmonary function, cardiomyopathy, and intellectual impairment.

The symptom is locomotory problem. The secondary symptoms include lead to weight gain, cushingoid features, hyperglycemia and growth restrictions. Changes in insulin signalling and mitochondrial function have also been observed. DMD patients show alterations in body composition and energy expenditure. Calf muscles are replaced by fat and connective tissue which leads to pseudo hypertrophy. This makes it abnormally susceptible to contraction induced sarcolemmal damage leading to muscle fibre disfunction, necrosis and replacement of lost tissues by adipose and connective tissues.

The progressive muscle degeneration ultimately leads to loss in ambulation. Difficulty in ambulation causes tippy toe walking.

The other recognizable traits involve shortness of breath

due to the paresis of respiratory muscles, causing pulmonary failure, the final stage.

There is also a difficulty in the movement of larynx. Protrusion of eye balls and drooping of upper eyelids due to paresis of eye muscles and ligaments attached to it. It may be congenitally acquired from a relative who expresses such minor traits.

Older patients, however, are at risk of underweight and malnutrition, amongst others due to increasing difficulties with eating. Therefore, the importance of nutritional management becomes more and more recognized. Knowledge is, however, lacking what are the best recommendations for DMD patients of different ages. The current guidelines only give general recommendations in the field of nutrition.

IV. TREATMENT

There is no defined cure for muscular dystrophy but corticosteroid therapy, occupational therapy, orthotic intervention, speech therapy, and respiratory therapy may be helpful. Low intensity corticosteroids may help to maintain muscle tone. Orthopedic appliances used for support and corrective orthopedic surgery may be needed to improve the quality of life in some cases. The cardiac problems that occur with EDMD and myotonic muscular dystrophy may require a pacemaker. Many Unani medicines and Homeopathic medicines can also be used in this disease. Yoga can also help us to prevent respiratory and pulmonary problems.

A famous traditional Chinese medicine (TCM) - Buzhong yiki (BZYK) has shown promising results. The herbs used had sufficient quantity of glucocorticoids, explaining their role in DMD treatment. Glucocorticoid replaced dysfunctional dystrophin with upregulated utrophin, an analogue of dystrophin.

The routine Indian treatments used: Shasti Shali Pinda Sweda as sweat inducing treatment (to help with muscle protein's health and improves energy level of body), yoga, stretching exercises, aerobic exercises, breathing exercises (pranayama), panchakarma treatment- to prevent toxin accumulation damage in body.

The Indian treatments that are in use have been mentioned in Tables (2) and (3).

V. DIAGNOSTIC TESTS

The tests used to record and evaluate the changes occurring include creatine kinase, X-ray, ultrasound, electro-myogram, nerve conduction velocity and vit D fatty regeneration of T9. The tests are represented in fig (2).

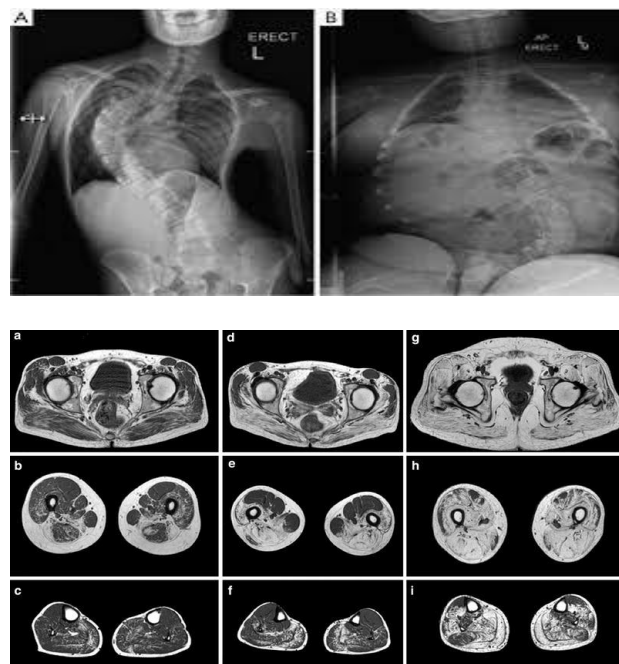


Fig. 2. Different diagnostic tests used in detection

VI. METHODOLOGY

(Natural Preparation)

A. Herbal infusion-

Involves process of steeping herbs in water until the water (considerably longer period) absorbs the oils and flavors. It is important to remember that some herbs can be harmful if consumed too much, such as if the infusions are allowed to steep too long. Combining the wrong herbs can also lead to problems. Hence, for this research has to be accordingly, by going through literatures for dosage levels.

B. Procedure-

Pour boiling water over the collected herbs and sealing the jar with a tight-fitting lid to keep the steam and volatile oils from escaping. Then straining and storage is done.

Plant source	Infusion time
Roots and barks	>8 hours
Leaves	>4 hours
Flowers	2 hours
Seeds and fresh berries	>30 minutes

C. Decoction-

Require stronger, more prolonged heat in order to extract the oils.



Chemical Preparation:

Collection of plant source



Evaluation of quality control parameters of raw materials



Qualitative phytochemical evaluation



Extracting the plant material



Formulation of Polyherbal tablets



Pre-formulation studies



Evaluation of Quality Control Parameters for Finished Product

VII. CONCLUSION

Muscular dystrophy is a group of diseases that are characterized by progressively weakened and Wasting of muscles. It is caused by mutation in many genes' codes for protein help in muscle activities i.e. dystrophin gene primarily. General symptoms of muscular dystrophy are difficulty in rising from a lying or sitting position, waddling gait, walking on the toes, large calf muscle, muscle pain and stiffness, trouble in running and jumping etc. The major problem is that the disease has no cure currently. Only some medication and physical therapies are available which can improve symptoms and slow down the progress of disease. Heart and corticosteroids are examples of medications. Physical therapy, respiratory therapy, speech therapy, occupational therapy are examples of therapies given to affected patient. A lot of research is going on for making medicines to treat muscular dystrophy. Some of allopathic medicines are in clinical phase of trials. Myoblast transplantation and gene therapy may also be possible and effective instead of it better to have medicine. Ayurveda has treasure of treatments for all diseases. Herbal medicines have been used since ancient times for being well and to treat diseases. As known that herbal medicines are safe and has less side effects. It will be better to have herbal medicine for treatment of muscular dystrophy. But a single herb cannot give satisfactory results. Therefore, hypothetically it has been analyzed that Polyherbal formulation of medicine along with varieties of therapies have be significant results.

VIII. FUTURE PROSPECTS

In this project, analyzed hypothetically the use of herbs along with therapies for better result in the treatment for

muscular dystrophy. In future, we can make surety of medicine that how effective is it or how Safe is it by doing clinical trials. Also, will find the evaluation of ingredients of polyherbal medicines. After successfully approval of polyherbal medicine it will possible to make tablets with this formulation. So, one can make a renowned future. Ones again Ayurveda show its best.

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VIII. Annexure:

Table (1): Types of Muscular Dystrophy

Sl. No.	Type of Muscular-Dystrophy	Mutated Gene	Symptoms	Causes	Affects
1)	Duchenne	DMD	The arms, legs and spine deformity and cognitive impairment. Breathing problems	Due to mutation in DMD gene (located in X chromosomes).	Only males
2)	Becker	DMD	Similar with Duchenne but its less variant	Similar with Duchenne but degradation is slower	Only males
3)	Facioscapulo humeral	DUX4	The muscle degradation occurs at face and shoulder blade.	Mutation in DUX4 gene either by causing demethylation or forming polyadenylation sequence downstream of DUX4.	Males are more affected than females
4)	Myotonic	DMPK, ZNF9	There occurs muscle weakness and affects the central nervous system, heart, eyes and endocrine glands.	Due to the production of a truncated, but partially functional form of dystrophin	Both males and females equally
5)	Congenital	Multiple	There occurs muscle weakness and degeneration by birth	Defects in proteins related to dystrophin-glycoprotein complex and connections between muscle cells and its cellular structure	Both males and females
6)	Oculopharageal	PABPN1	Deformity occurs in eyes and throats	Due to short repeat expansion in the genome which regulates the translation of some genes into functional proteins	Both males and females in adult stages
8)	Emery Dreifuss	LMNA, EMD	Occurs weakness and wasting of the distal muscles and also suffer from cardiac conduction defects and arrhythmias	Mutations in the LMNA gene or EMD gene. Both genes encode for protein components of the nuclear envelope.	Only Females
9)	Limb girdle	Multiple	progressive weakness that begins in the hips and moves to the arms, and legs.	-	Both males and females



10)	Distal	DYSF	Occurs weakness and wasting of the distal muscles	Mutation in DYSF genes	Both males and females
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Table (2): Formulation of components for Muscular Dystrophy

Indian herbs	Scientific name	Dosage	Activities and application
Giloy	<i>Tinospora cordifolia</i>	Stem powder 3-6 gm Giloy satva 500 mg -1 gm	IM, AI, AO
Arjuna	<i>Terminalia arjuna</i>	Bark powder 1-3 gm/ 2 to 3 times a day with water or milk. Decoction 50 -100 ml.	Prevents cardiac complications, improves respiratory issues.
Ashwagandha	<i>Withania somnifera</i>	Powder 3-6 gm a day Decoction 16 to 31 gm with milk Alcoholic extract 2tbsp, 2 to 4 times a day	Preserve muscle mass, prevents weakness, promotes regeneration of muscle cells.
Bala	<i>Sida cordifolia</i>	Usually added to oil for external applications.	IM, helps body to resist degeneration.
Brahmi	<i>Bacopa monnieri</i>	250-500 mg	Improves muscle mass, enhance function of nerves, AO.
Safed musli, Gokshura	<i>Cholorophytum borivillianum</i> <i>Tribulus terrestris</i>	500-1000 mg	Manage weakness and fatigue. Supports metabolism of tissues.
Shatavari	<i>Asparagus racemosus</i>	500 mg- 1000 mg	Laxative, rejuvenator, antacid, IM, detoxifier.
Shallaki, Haridra	<i>Boswellia serrata</i> , <i>Curcuma longa</i>	500 mg- 1000 mg	AI, analgesic, prevents tissue breakdown.

Table (3): Composition of the formulation of Muscular Dystrophy with readily available compounds

Indian Medicines	Components	Dosage
Ashwagandha capsules	<i>Withania somnifera</i>	1 capsule two times in a day with plain water after meals.
Yograj Guggal	<i>Commiphora mukul</i> , <i>Cyperus rotundus</i> , <i>Plumbago zeylanica</i> , <i>Embellica officinalis</i>	2 tablets twice in a day with lukewarm water.
	<i>Terminalia bellirica</i> , <i>Terminalia chebula</i> , <i>Piper longum</i> , <i>Carum copticum</i> , <i>Embelia ribes</i> , <i>Tribulus terrestris</i> , <i>Cuminum cyminum</i> , Rock salts, <i>Zinger officinale</i> .	
Atirasadhi churna	<i>Chlorophytum borivillianum</i> , <i>Curculigo orchoides</i> , <i>Salmalia malabarica</i> , <i>Tribulus terrestris</i> , <i>Asparagus racemosus</i> , <i>Withania somnifera</i> , <i>Anacylus pyrethrum</i> , <i>Dioscorea tuberosa</i> , <i>Centurea behen</i> , <i>Myristica fragrans</i> , <i>Hygrophilla spinose</i> , <i>Crocus sativus</i>	One tablespoon of powder with plain water or milk twice in a day.
Musli strength	<i>Cholorophytum borivillianum</i> , <i>Tribulus terrestris</i>	1-2 capsules with water after meals
Shatavaru capsules	<i>Asparagus racemosus</i>	1-2 capsules twice daily with plain water
Boswellia curcumin	<i>Boswellia serrata</i> , <i>Curcuma longa</i>	1 capsule 2 times daily with plain water.
Bramhi chawanprash	<i>Bacopa monnieri</i> , <i>Sida cordifolia</i> , <i>Withania somnifera</i> , <i>Phyllanthus niruri</i> , <i>Asparagus racemosus</i> , <i>Cyperus rotundus</i>	As advised.

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