Module 6
How is Duchenne muscular dystrophy (DMD) managed?

Dyne | Medical Central

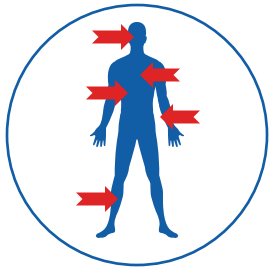
Module summary

Individuals with DMD are cared for by a multidisciplinary team[1,2]

Care is individualized across the lifespan based on stage of disease, therapeutic response, and tolerance[1,2]

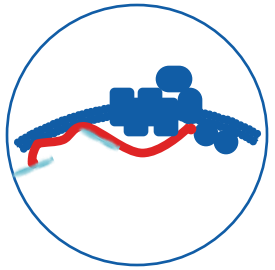
Treatment goals in DMD are to preserve function and quality of life[1,2]

The focus is on maintaining ambulation, maintaining cardiac and respiratory function, managing complications, and preserving quality of life[1,2]



Treatment of DMD requires a multifaceted approach using both disease-modifying and symptom-based approaches[3]

Currently, corticosteroids are the mainstay of care in DMD, however, guidelines are evolving as new therapeutics become approved[1,4]



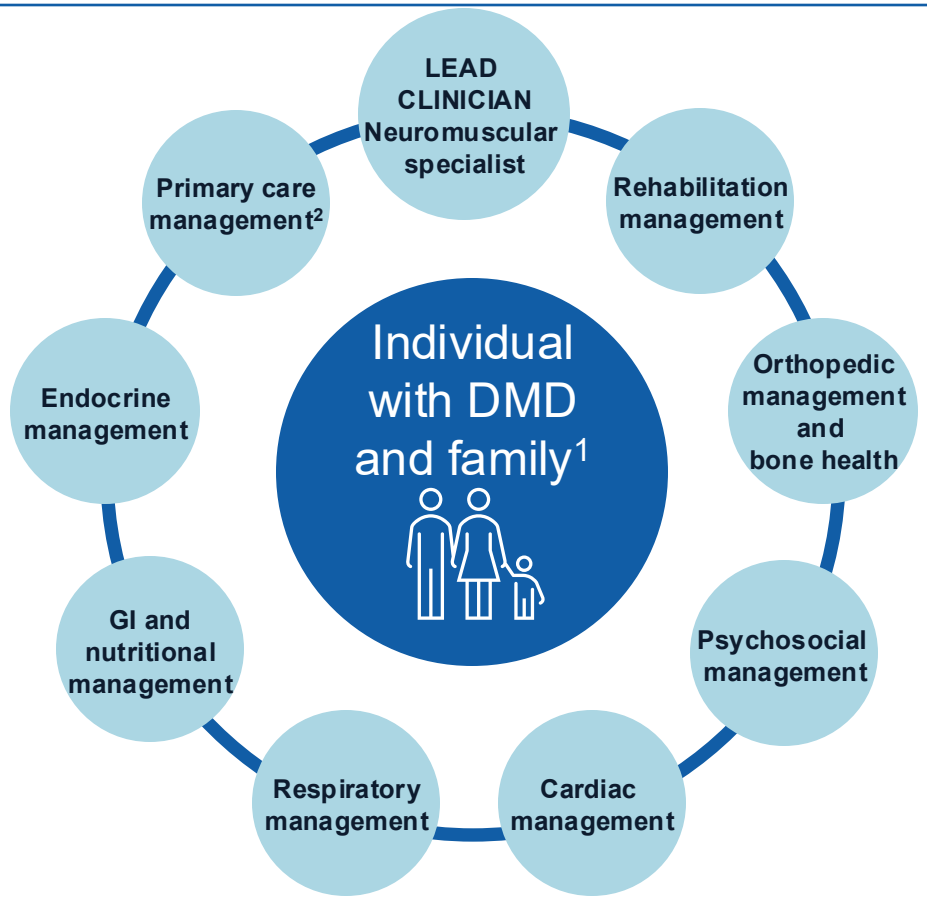
Some approved and investigational therapies aim to restore dystrophin production[3]

Even low dystrophin expression has been associated with delayed clinical milestones, compared to no dystrophin expression[5]

DMD, Duchenne muscular dystrophy.

1. Birnkrant DJ, et al. *Lancet Neurol.* 2018;17:251–267; 2. Birnkrant DJ, et al. *Lancet Neurol.* 2018;17:445–455; 3. Yao S, et al. *Front Cell Dev Biol.* 2021;9:689533; 4. Wolff JM, et al. *Neuromuscul Disord.* 2025; 35:106208; 5. de Feraudy Y, et al. *Ann Neurol.* 2021;89:280–292.

Who makes up the multidisciplinary team caring for individuals with DMD?



Management of individuals with DMD requires a multidisciplinary team approach to individualize care based on the individual's needs, stage of disease, therapeutic response, and tolerance across their lifespan [1,2]

DMD, Duchenne muscular dystrophy; GI, gastrointestinal.
1. Birnkrant DJ, et al. *Lancet Neurol.* 2018;17:251–267; 2. Birnkrant DJ, et al. *Lancet Neurol.* 2018;17:445–455.

What are the main goals of treatment for DMD?

Maintain ambulation

- Prevent muscle atrophy[1,2]
- Delay loss of ambulation[1,3–5]
- Improve muscle function[4–6]
- Preserve upper limb function[3,4]

Maintain cardiac and respiratory function

- Delay respiratory decline[4,5,7,8]
- Delay the onset of cardiomyopathy[1]
- Prevent heart failure[9]

Manage disease complications

- Inflammatory damage to muscle[2]
- Cardiomyopathy[9,10]
- Skeletal deformities[3,11]
- Respiratory failure[7,12]
- Managed by pharmacologic and non-pharmacologic interventions[3]
- Improve psychosocial management and QoL, growing priorities as life expectancy increases[3]

Preserve QoL

- Prolong survival[3,9]
- Prolong independent ambulation[3,6,9]

Treatment of DMD requires a multifaceted approach using both disease-modifying and symptom-based approaches[1]

DMD, Duchenne muscular dystrophy; QoL, quality of life.

1. Yao S, et al. *Front Cell Dev Biol.* 2021;9:689533; 2. Arpan I, et al. *Neurology.* 2014;83:974–980; 3. Birnkrant DJ, et al. *Lancet Neurol.* 2018;17:251–267; 4. McDonald CM, et al. *Lancet.* 2018;391(10119):451–461; 5. Mitelman O, et al. *J Neuromuscul Dis.* 2022;9:39–52; 6. Henricson EK, et al. *Muscle Nerve.* 2013;48:55–67; 7. Finder JD, et al. *Am J Resp Crit Care Med.* 2004;170:456–465; 8. Khan N, et al. *J Neuromuscul Dis.* 2019;6:213–225; 9. Birnkrant DJ, et al. *Lancet Neurol.* 2018;17:347–361; 10. Allen HD, et al. *PLoS Curr.* 2013;5:ecurrents.md.2cc69a1dae4be7dfe2bcb420024ea865; 11. Cervellati S, et al. *Eur Spine J.* 2004;13:441–448; 12. Ishikawa W, et al. *Neuromuscul Disord.* 2011;21:47–51.

In the era of new therapeutics, are DMD care guidelines evolving?

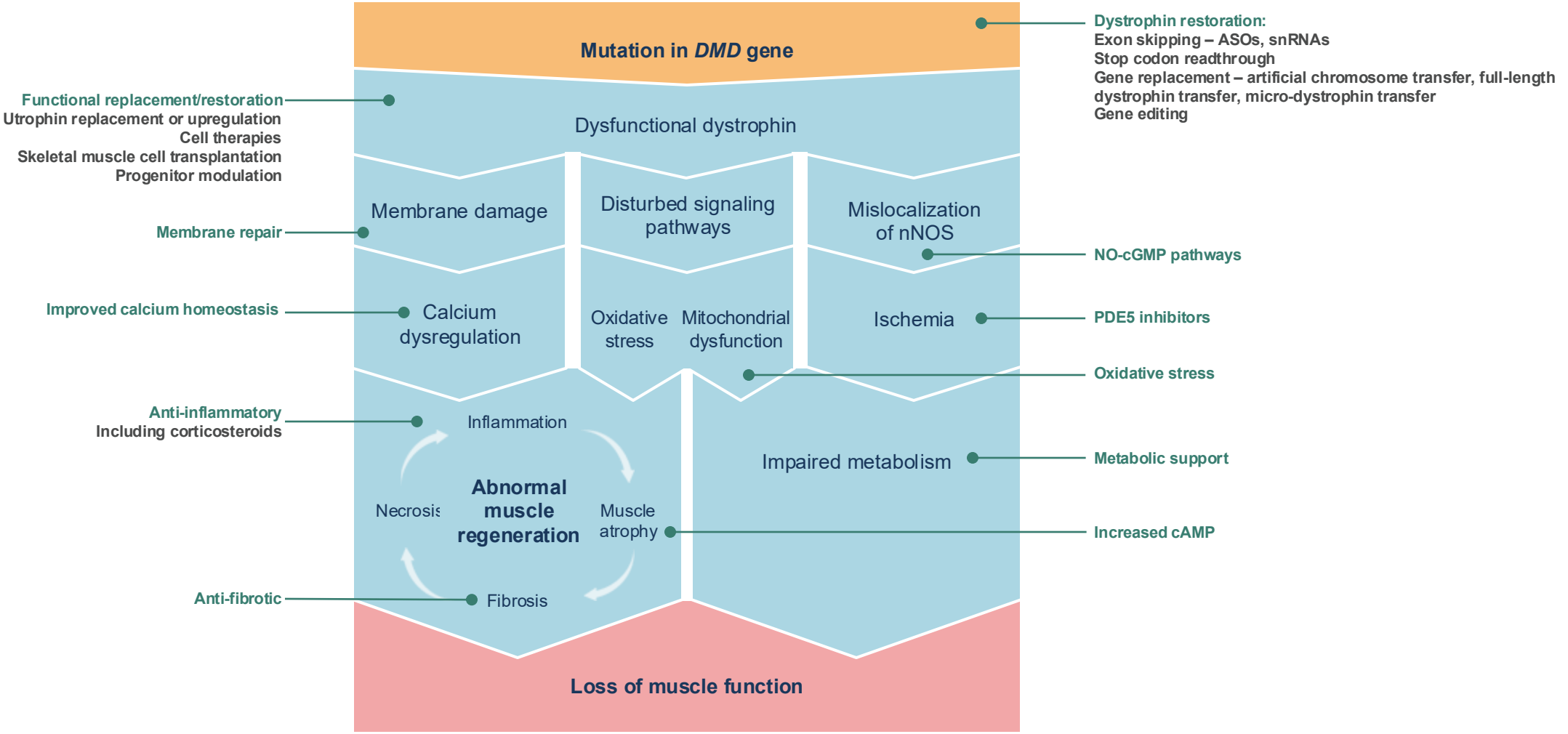
- **Management of DMD requires a multidisciplinary approach[1–4]**
- **Current DMD care guidelines focus on steroids as the mainstay of DMD treatment[1–3]**
- **Recent consensus guidelines provide initial recommendations for integrating approved gene therapy into DMD care[1,2,4,5]**
- **Consensus expert opinion available on the use of eteplirsen but not other PMOs[4]**

With the approval of new therapeutics, regular updates to DMD care guidelines are essential[4,5]

DMD, Duchenne muscular dystrophy; PMO, phosphorodiamidate morpholino oligomer.

1. Birnkrant DJ, et al. *Lancet Neurol.* 2018;17:251–267; 2. Birnkrant DJ, et al. *Lancet Neurol.* 2018;17:347–361; 3. Birnkrant DJ, et al. *Lancet Neurol.* 2018;17:445–455; 4. Rivera SR, et al. *PLoS One.* 2020;15:e0240687; 5. Wolff JM, et al. *Neuromuscul Disord.* 2025;35:106208.

What therapeutic strategies are used in DMD (approved and investigational)?[1,2]

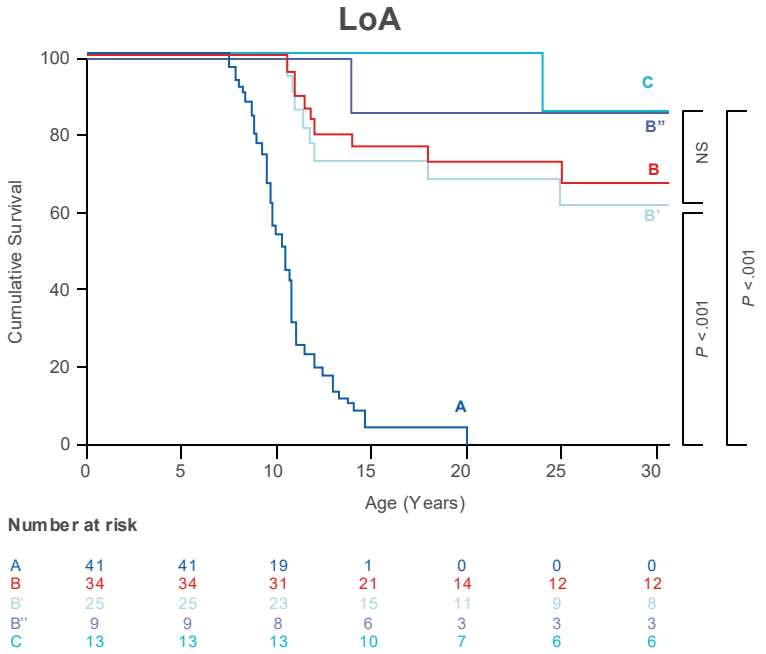


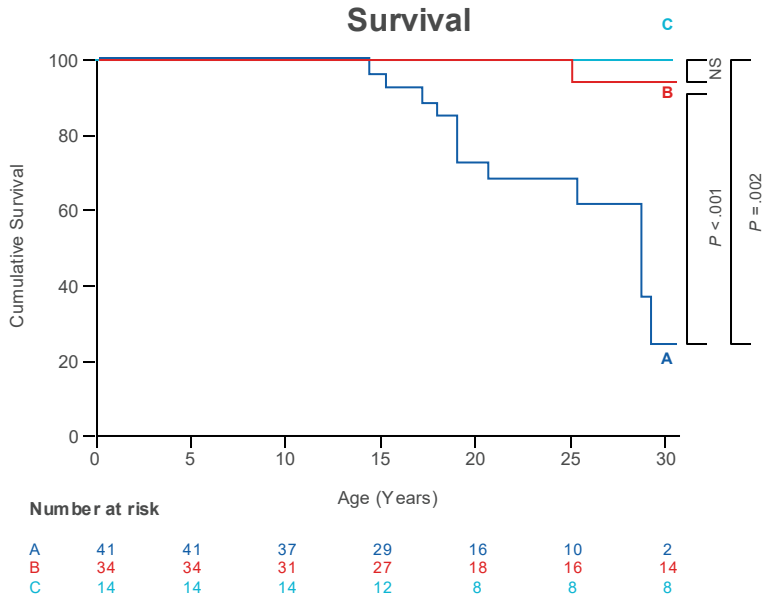
ASO, antisense oligonucleotide; cAMP, cyclic adenosine monophosphate; cGMP, cyclic guanosine monophosphate; DMD, Duchenne muscular dystrophy; nNOS, neuronal nitric oxide synthase; PDE5, phosphodiesterase type 5; snRNA, small nuclear RNA.

1. Yao S, et al. *Front Cell Dev Biol.* 2021;9:689533; 2. Mbakam CH, et al. *Front Med (Lausanne).* 2022;9:859930.

Do low levels of dystrophin expression impact DMD disease progression?

Spontaneous, endogenous exon skipping associated with certain deletion mutations in *DMD* can lead to dystrophin expression, resulting in significant variation in disease trajectories.





Compared to no dystrophin, levels <5% (and as low as <0.5%) were associated with a milder DMD clinical phenotype, including delays in LoA and decline in cardiorespiratory function (measured by VC <50% and LVEF <55%)* and increased survival.

A: No dystrophin B: <5% dystrophin B’: 0-0.5% dystrophin B”: 0.5-5% dystrophin C: ≥5% dystrophin

Restoration of even very low dystrophin expression has been associated with delayed clinical milestones in individuals with DMD, suggesting that any amount of dystrophin expression may have therapeutic benefit

*Data not shown.
DMD, Duchenne muscular dystrophy; LoA, loss of ambulation; LVEF, left ventricular ejection fraction; NS, not significant; VC, vital capacity.
Images used with permission of The Authors, from de Feraudy Y, et al. *Ann Neurol.* 2021;89:280–292; permission conveyed through Copyright Clearance Center, Inc.
de Feraudy Y, et al. *Ann Neurol.* 2021;89:280–292.